FUJI FILM SERVICE MANUAL

FUJI
MINILAB 23
FILM PROCESSOR
FP350
FP350AL

FOURTH EDITION

PP3-C622E4

tel: (3952)

FUJI FILM SERVICE MANUAL

FUJI MINILAB FILM PROCESSOR

FP350/FP350AL

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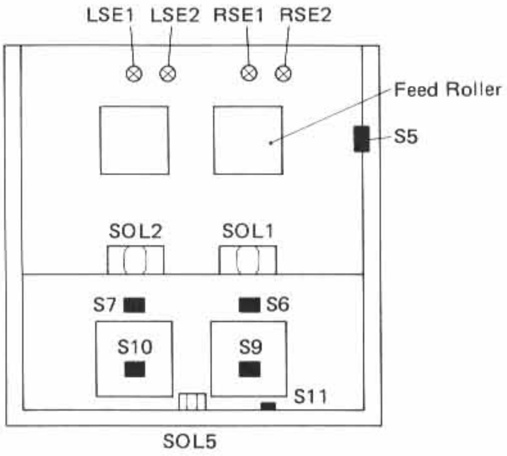
1. COMPONENT LOCATIONS AND DESCRIPTIONS

1.1 Film Feed Section Sensor Locations and Functions

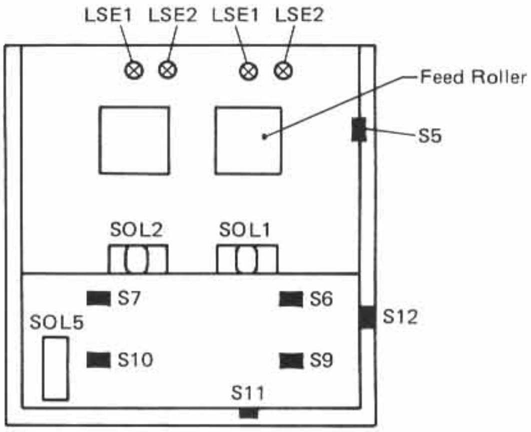


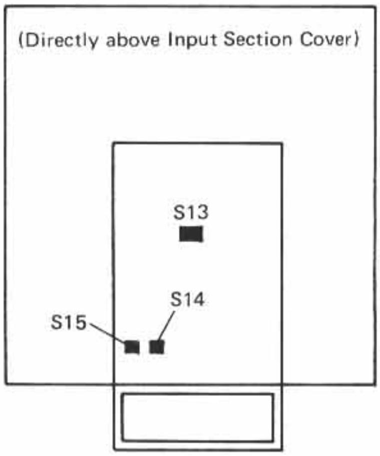
Feed Section Top View

NOTE: Film trailing end pressure solenoids (SOL3 and SOL4) are mounted on the feed section top cover.

AL Type

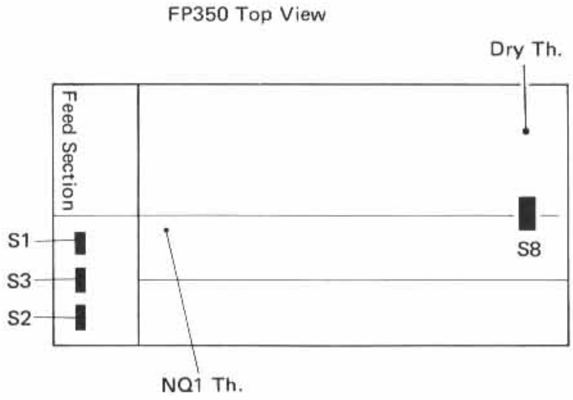
(Directly above Input Section)





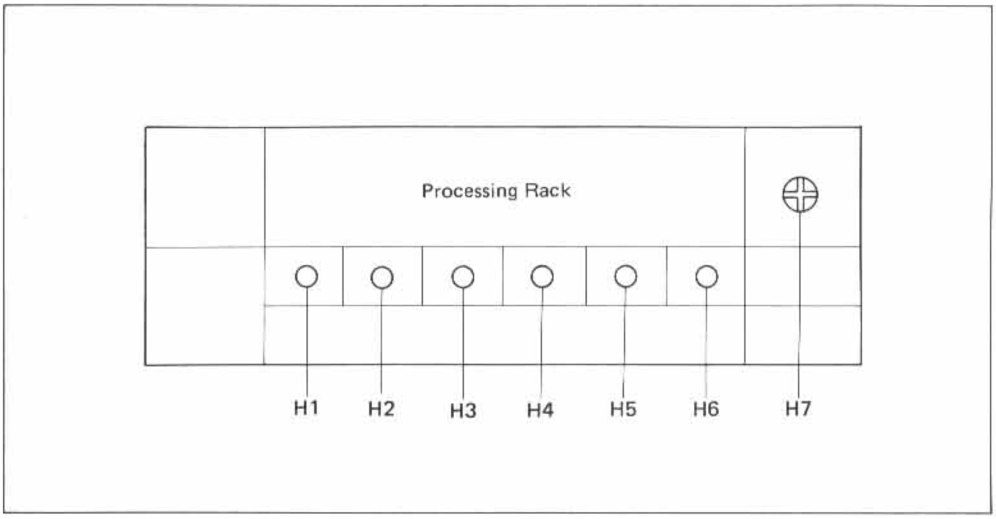
Symbol	Function	Part Used
LSE1	Left-strand film detection	Sensor (red LED and phototransistor)
LSE2	Left-strand perforation detection	
RSE1	Right-strand film detection	
RSE2	Right-strand perforation detection	
S5	Feed section cover status detection	Microswitch
S6	Right-strand film cut detection	
S7	Left-strand film cut detection	
S9	Right-strand film trailing end pressure detection	
S10	Left-strand film trailing end pressure detection	
S11	Feed section automatic lock release	
S12	Leader throughput motor cam detection	
S13	Leader detection	
S14	Cassette detection	
S15	Shielding cover detection	
SOL1	Right-strand film trailing end cut	Solenoid
SOL2	Left-strand film trailing end cut	
SOL3	Right-strand film trailing end pressure	
SOL4	Left-strand film trailing end pressure	
SOL5	Feed section cover automatic lock	

1.2 Other Sensor Locations



Symbol	Name/Function	Part Used
S1	POWER switch; power ON signal	Switch
S2	START switch; drive start signal	Switch
S3	STOP switch; drive stop signal	Switch
S8	Processing section cover status detection	Microswitch
NQ1 Th.	NQ1 temperature detection	Temperature sensor
DRY Th.	Dryer temperature detection	Temperature sensor

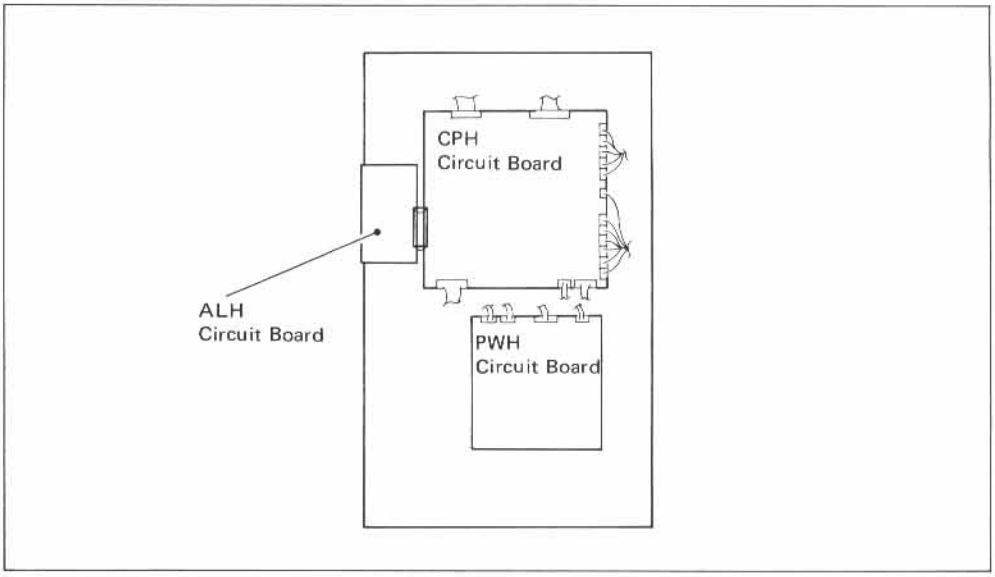
1.3 Heater Locations and Capacities



Symbol	Associated Section	Overseas Type Heater Capacity
H1 H3	NQ1 NQ3	240 V, 288 W
H2 H4 H5 H6	NQ2 NQS1 NQS2 NQ4	240 V, 200 W
H7	Dryer	230 V, 1 kW

NOTE: Heaters H1 through H6 are ceramic heaters.

1.4 Circuit Board Locations and Functions



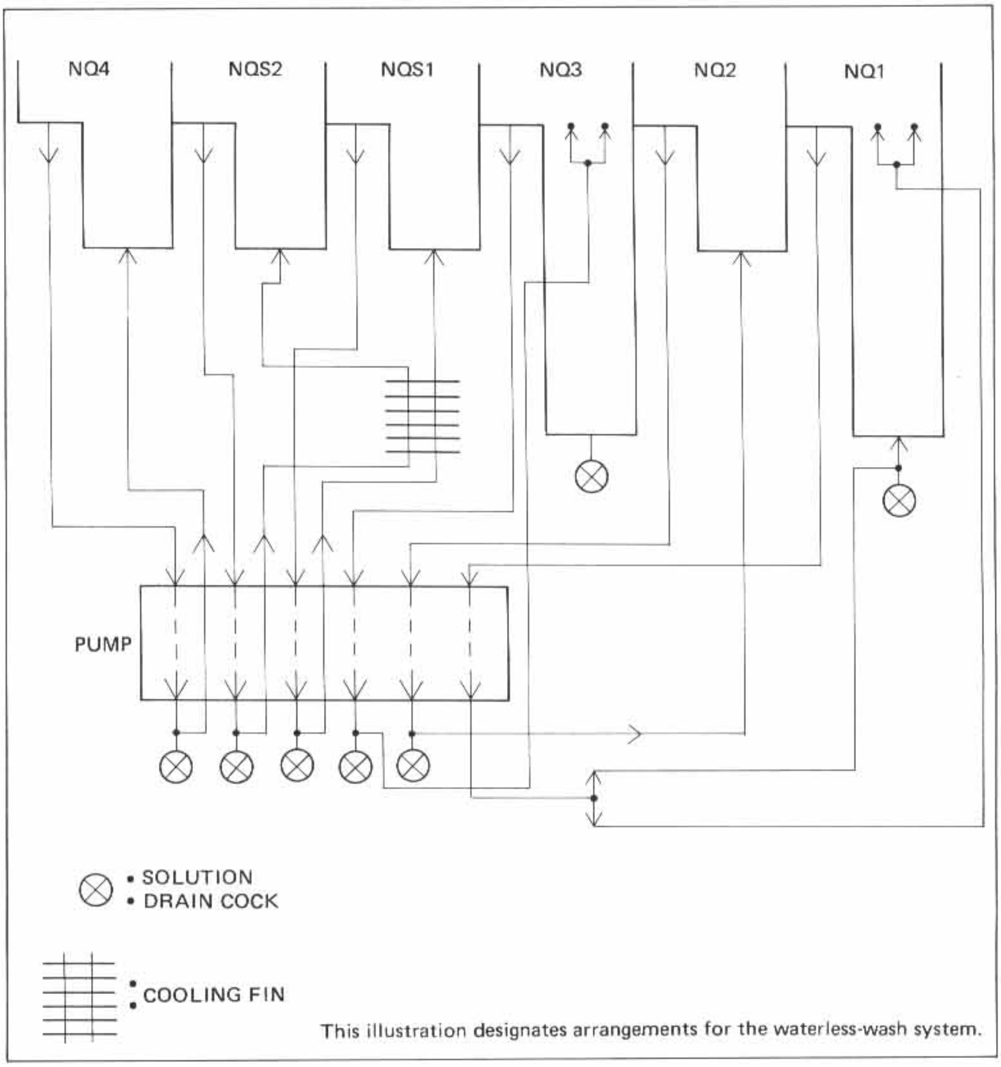
(1) CPH Circuit Board
- I/O control of other circuit boards, keyboard, and display
- Program control
- Solenoid and alarm drive
- Switch and sensor I/O control
- Motor and pump drive control
- Other I/O control

(2) PWH (Power) Circuit Board
- 100/200VAC relay ON/OFF (for solution and dryer heaters, etc.)
- +5 and +12 V power supply

(3) ALH Circuit Board (FP350AL)
- Various Automatic Loader Switching Input Controls
- Automatic Loading Throughput Motor Drive Control

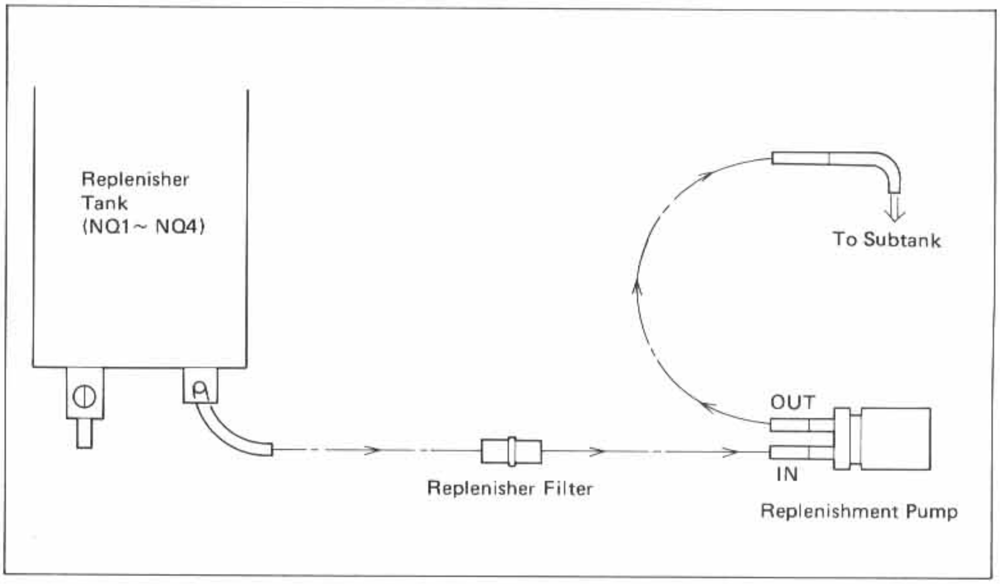
1.5 Piping System Diagram

1.5.1 Processing Solution Circulation System Diagram

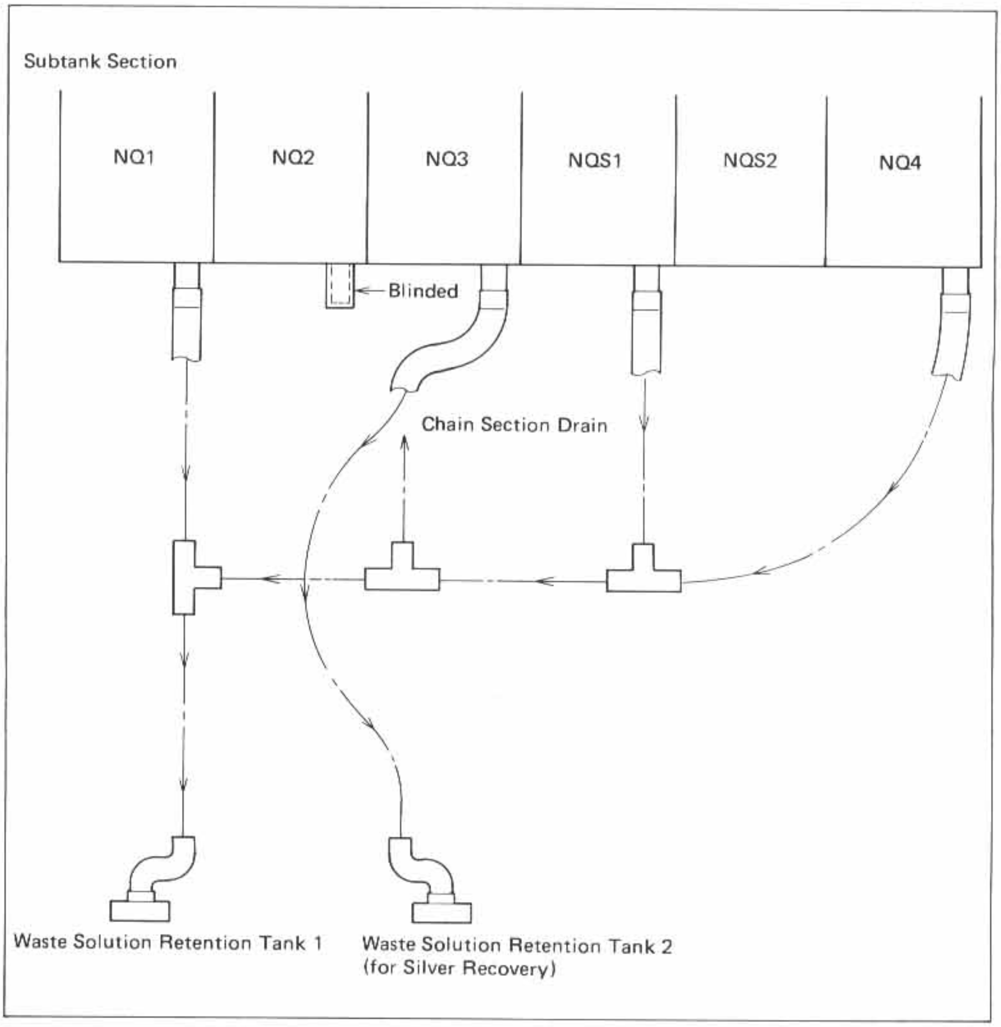


This illustration designates arrangements for the waterless-wash system.

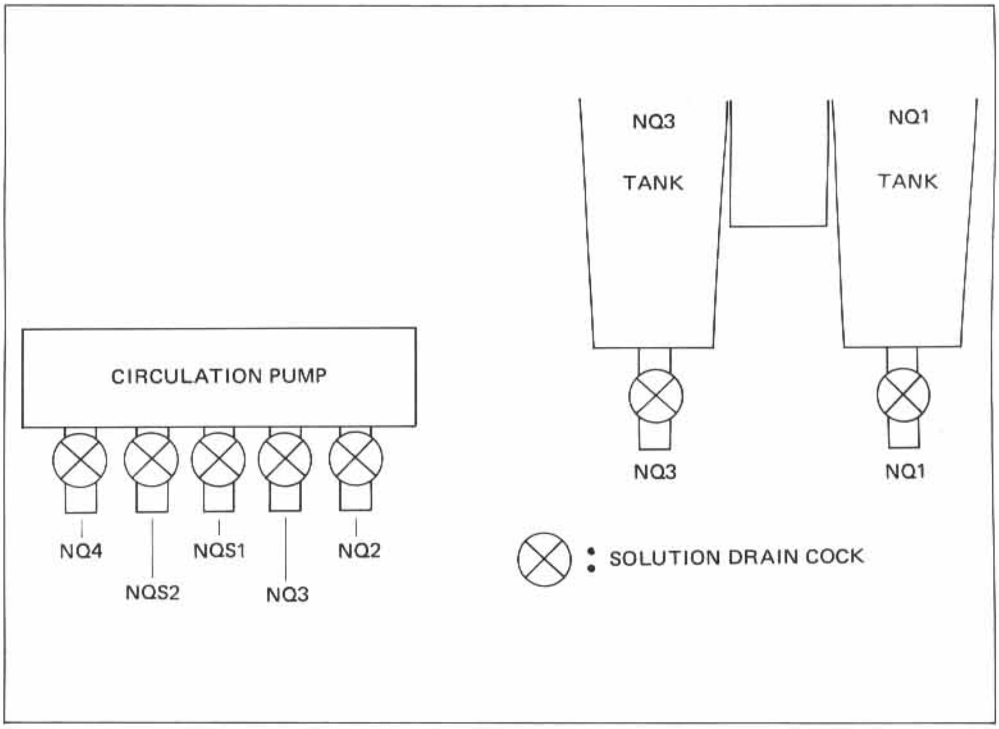
1.5.2 Replenishment System



1.5.3 Overflow System



1.5.4 Solution Drain Cock Arrangement Diagram



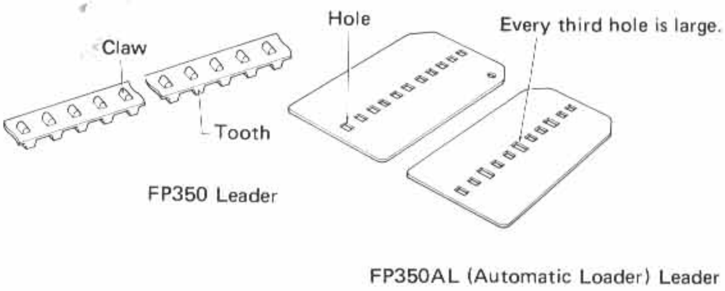
1.6 Voltage Requirements

Voltage	Check Terminal	Permissible Range	Supplied To
200 VAC			Solution and dryer heaters
100 VAC			Drive motors, circulation pumps, replenishment pumps, dryer fan, etc.
+12 V	TP3-TP6	+12V ± 0.1V	Replenisher tank solution level sensor, indicator lamps, display devices, alarms, and other analog signal system components
+6 V	TP4-TP5	+6V ± 0.25V	Analog signal system (+12 V is converted to +6 V on the CPH circuit board.)
+5 V	TP1-TP2	+5V ± 0.1V	Digital system ICs (logic circuits)

NOTE: See section 5.31.1.

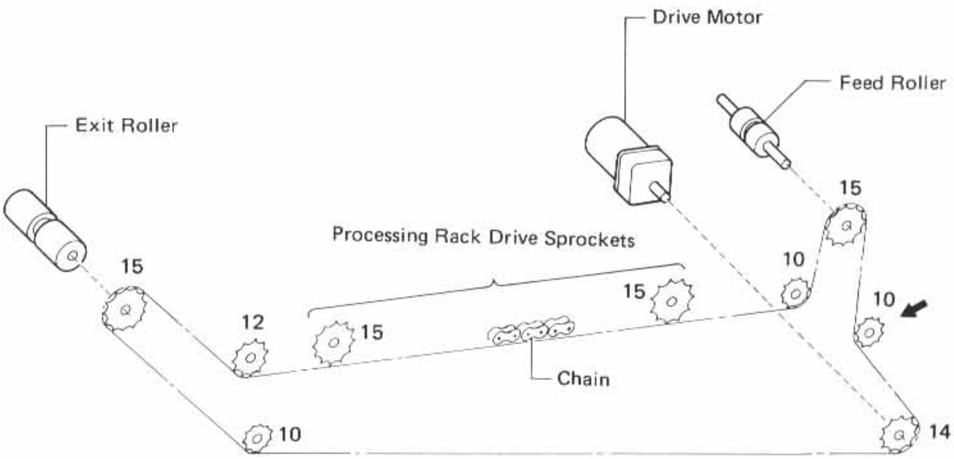
2. FILM TRANSPORT SYSTEM

2.1 Belts and Leaders



A belt is provided in the center of each rack.
The belt teeth mesh with the gears located in the upper and lower sections of each rack. Note that transport energy is transmitted by the upper gears.
Film is transported by a leader. The leader is carried by the belt as belt claws lodge in leader holes.

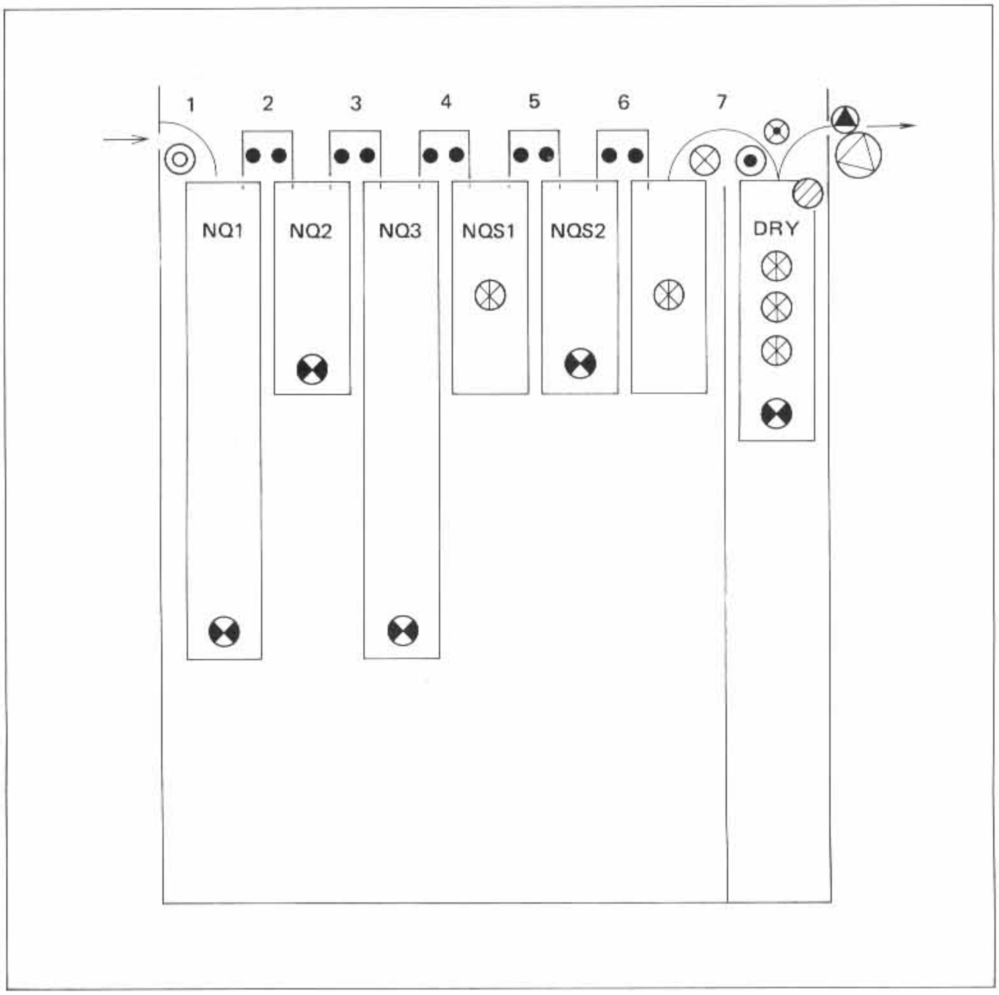
2.2 Drive System Diagram



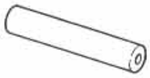
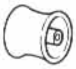
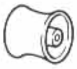
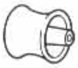
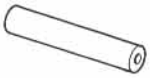
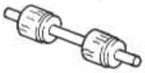
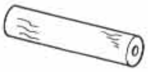
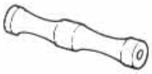
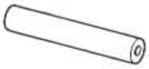
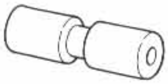
NOTE 1: Numbers in the illustration indicate the number of sprocket teeth.
Sprockets marked * are made of steel.

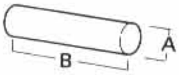
NOTE 2: Chain tension is provided by the spring attached to the sprocket indicated by the arrow.

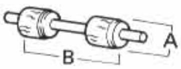
2.3 Processing Section Rollers



The processing section employs 10 types of rollers. They differ in shape and material. Therefore, exercise care in roller replacement so as to avoid erroneous interchange.

Symbol	A	B	Shape	Material
◎	29	106	 Flat Roller	PVC
●	20	37	 Hourglass Roller	Polypropylene
⧗	30	40	 Hourglass Roller	Polypropylene
⊛	30	40	 Hourglass Roller	Polypropylene
⊗	26	106	 Flat Roller	PVC
⦻	28	104.5	 Flannel Wound Flat Roller (Shaft Attached)	PVC
⦿	32	106	 Flannel Wound Flat Roller	PVC
▨	26	121	 Double-hourglass Roller	PVC
▲	25	115	 Flat Roller (Bearing Incorporated)	SUS
△	28	124.5		Rubber





A: Roller diameter (mm)
B: Roller length (mm)

2.4 Squeegee Blades

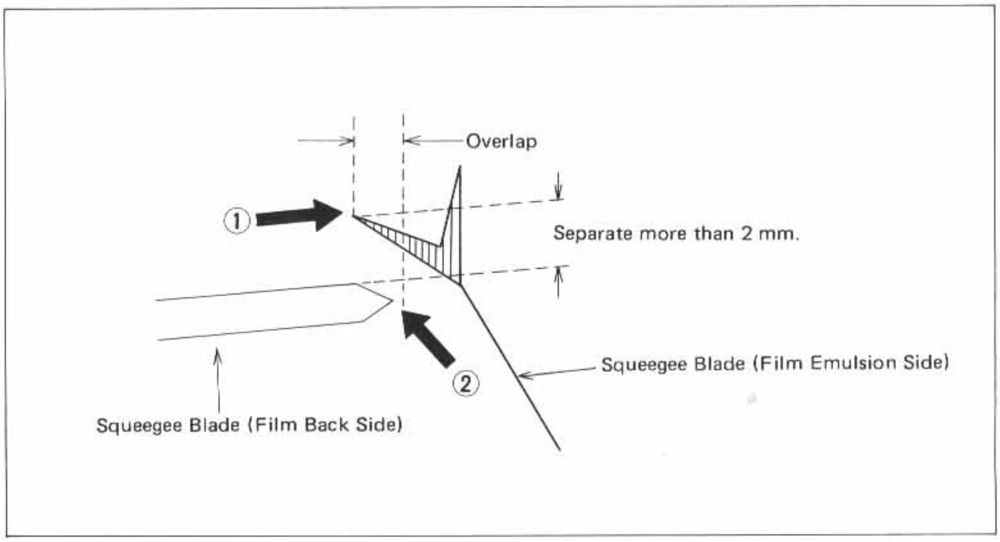
The FP350 employs special silicone squeegee blades only.

< Squeegee Blade Adjustment >

1. Adjust the squeegee blade overlap as indicated below.

NQ1-NQS2	0.5 mm
NQ4	1 mm

NOTE: No squeegee blade is provided for the NQ2 rack.


Overlap
①
Separate more than 2 mm.
②
Squeegee Blade (Film Emulsion Side)
Squeegee Blade (Film Back Side)

2. Ensure that the film-contacting blade surfaces (① and ② in the above figure) are free of scratches and cracks. Also be sure that the blades are positioned in parallel with traveling film.

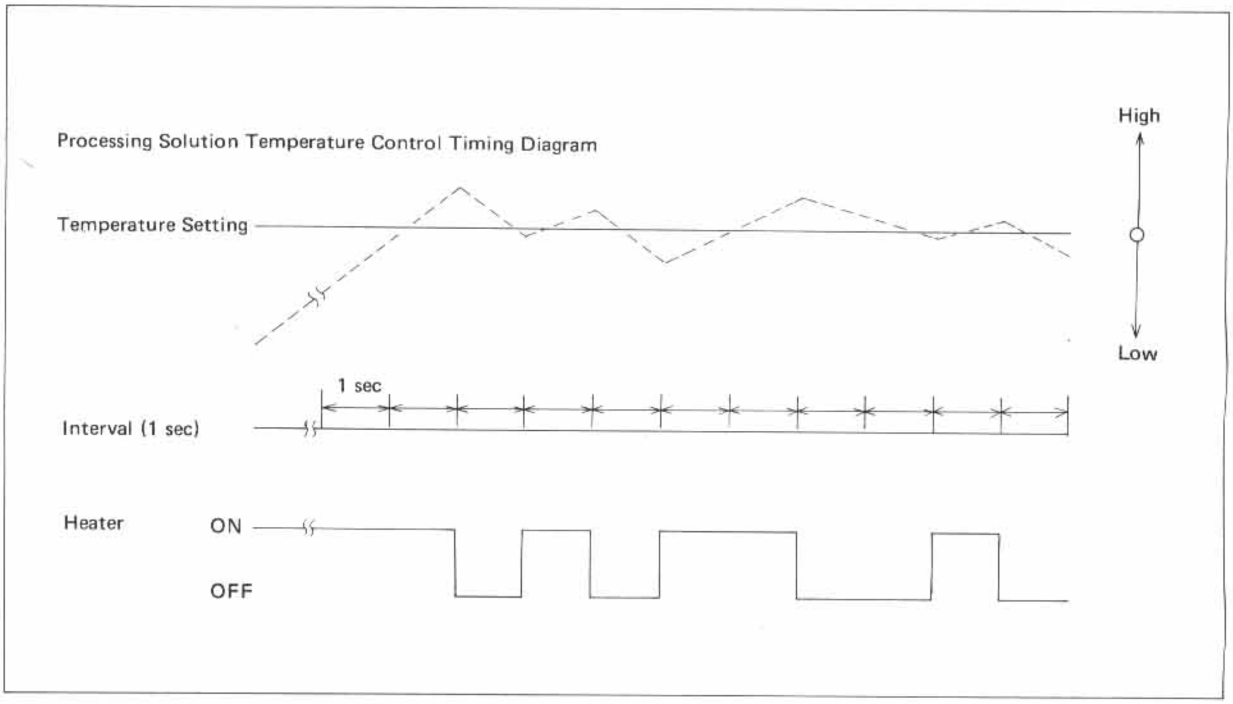
3. OPERATIONAL SEQUENCES

3.1 Operational Sequence Overview

No.	Status	Description
1	POWER switch ON	The following components start operating when the POWER switch is turned ON. ● Exhaust Fan (FAN2) ● NQS Cooling Fan (FAN3) ● The program version is displayed for 2 seconds. After that the following functions are initiated. ● Circulation Pump P1 ● Solution Heaters (H1 through H6) – Start temperature control maintenance. (See section 3.2.) **< When Weekly Timer is Used >** 1. The power automatically turns on at the time preselected on the timer. 2. The display then shows the message "POWER SWITCH ON." If the POWER switch is not turned ON at this time, no keys are operative and the power automatically turns off 3 hours later.
2	Drive	**< Conditions >** 1. All processing solutions are heated to preselected temperatures. (Or compulsory standby conditions.) 2. Processing section cover is closed. 1) When the START switch is pressed, the drive system actuates. ● Dryer fan (FAN1) starts running. ● Dryer heater (H7) starts temperature control maintenance. (See section 3.3.) 2) When the STOP switch is pressed while the drive system is running, the drive system comes to a stop. ● Dryer heater turns off. ● Dryer fan stops 30 seconds after dryer heater turn-off.
3	Film processing system readiness	**< Conditions >** 1. Drive system is in operation. 2. The message "READY FOR PROCESSING" is displayed.
4	Film loading and film detection	1. When the film feed section cover is closed with film loaded. With the AL type the cassette is set and the YES key pressed. ● The feed section cover detection microswitch (S5) goes ON. ● After about a second, the film feed section cover is locked. (See section 3.4.) 2. Film detection sensor (LSE1/RSE1) stays ON for 2 seconds, and then "FILM BEING DETECTED" is displayed and the "NQ1" indication starts flashing. 3. Film perforation sensor (LSE2/RSE2) goes ON 7 seconds and the system identifies the film size in two seconds. (See section 3.5.) ● Film size indication appears on the display. ● Replenishment pump operational sequence starts. (See section 3.6.) 4. When the magazine is pulled, the film trailing end pressure detection microswitch (S9/S10) goes ON. This causes the film trailing end pressure solenoid (SOL3/SOL4) to go ON and press the film. (See section 3.7.)

No.	Status	Description
4	Film loading and film detection	5. When the film cut detection microswitch (S6/S7) goes ON, the cutter solenoid (SOL1/SOL2) goes ON to cut the film. (See section 3.8.) 6. After the film detection sensor stays OFF for 2 or more seconds, film length check is performed. (See section 3.9.) 7. After film trailing end detection, the film use counter increments by 1. 8. When 20 seconds have elapsed after film trailing end detection (film detection sensor turn-OFF), the following message appears on the display with the alarm sounding. **Ready For Processing** 9. When 4 minutes have elapsed after film trailing end detection, the flashing "NQ1" indication goes off. 10. When 12 minutes and 30 seconds have elapsed after film trailing end detection, the automatic shutoff function activates. This causes the drive system and dryer heater to stop immediately, and the dryer fan to turn off 30 seconds later. **NOTE 1:** Sequential steps 9 and 10 are cleared when another film detection is made within the specified time. **NOTE 2:** The above indicated operations are performed independently for each of the right- and left-strand films. However, the film use counter indicates the total number of film rolls processed in the right- and left-hand strands.

3.2 Processing Solution Temperature Control

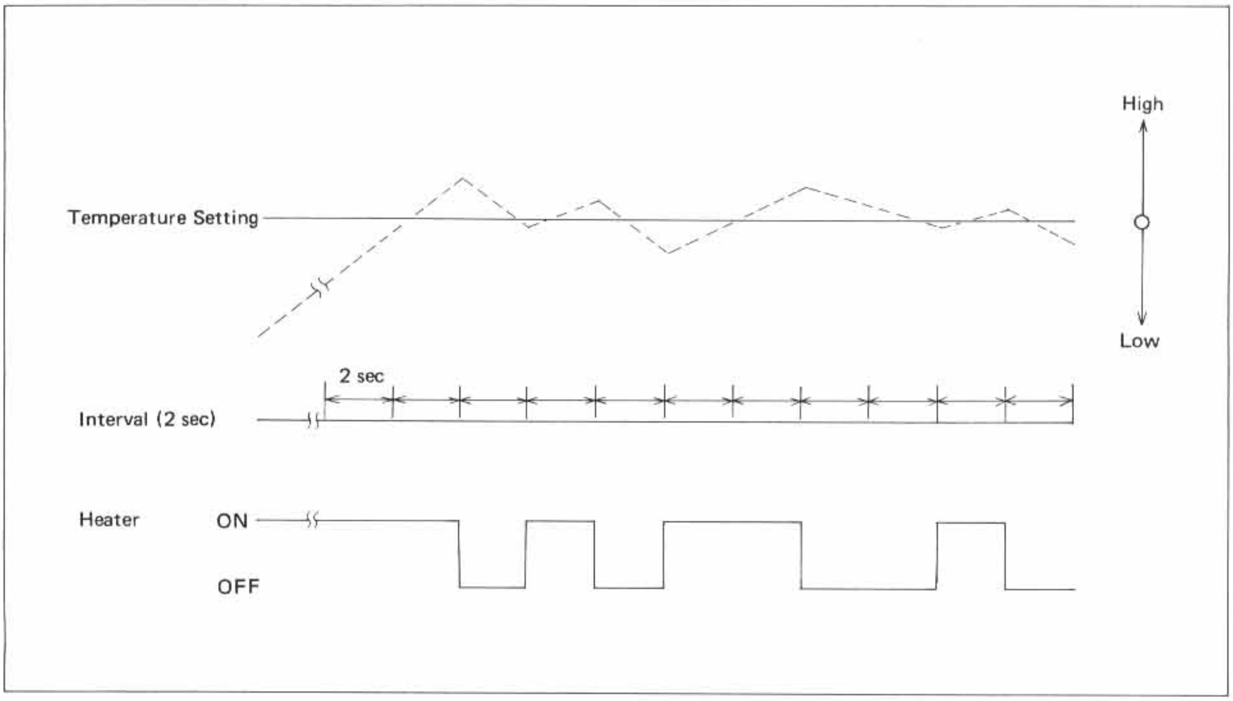


1. When the POWER switch is turned ON, the system initiates temperature control.
2. The system provides temperature detection at 1 second intervals to check on deviations from the initial setting and turns the heater on and off accordingly.
   NOTE: NQS1 and NQS2 temperature control is provided by the NQS1 sensor.

Processing Solution	Heater Capacity	Temperature Sensor
NQ1	240 V, 288 W	Thermistor type temperature sensor
NQ2 NQ3 NQS1, NQS2 NQ4	240 V, 288 W 240 V, 288 W 240 V, 288 W 240 V, 288 W	Temperature sensor built into the ceramic heater

3. When the POWER switch is turned OFF, the temperature control operation stops.

3.3 Dryer Temperature Control



1. When the START switch is turned ON, the dryer heater (H7) actuates.
2. A Nichrome heater is employed for temperature control. The system provides 2 second intervals temperature detection through a thermistor type temperature sensor to check on deviations from the initial setting and turns the heater on and off accordingly.
3. When the STOP switch is pressed or the automatic shutoff system is activated, the dryer heater turns off.

3.4 Film Feed Section Cover Automatic Lock ON/OFF

< Automatic Lock ON Conditions >
① Drive system is activated.
② Film feed section cover is closed.

1. When the film feed section cover is closed, the cover detection microswitch (S5) goes ON.
2. When one second has elapsed after S5 turn-ON, the automatic lock solenoid (SOL5) goes ON to lock the film feed section cover.
3. If the film detection sensor (LSE1/RSE1) does not go ON within 30 seconds after automatic lock solenoid turn-ON, the automatic lock solenoid goes OFF.
4. When the following display message appears after film processing, the automatic lock solenoid goes OFF.

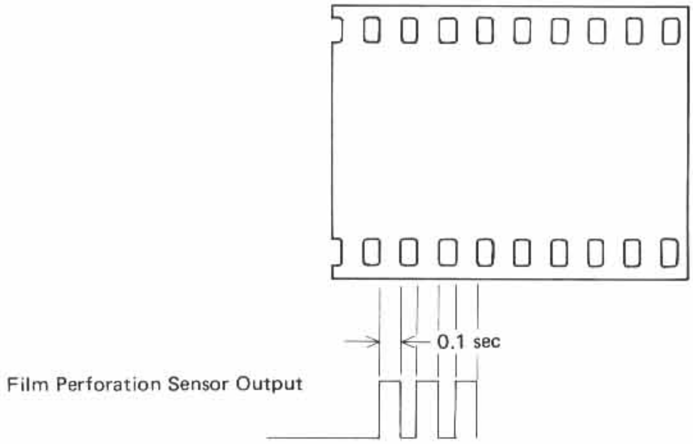
Ready For Processing

5. The automatic lock solenoid stays OFF while the automatic lock release switch (S11) is pressed.

3.5 Film Size Identification

When film is fed into the processor, the film detection sensor (LSE1/RSE1) stays ON. Film sizes are identified by the 2-second film perforation sensor (LSE2/RSE2) output that is generated 9 seconds after film detection sensor activation.

1 When 135 film is fed into the processor, the film perforation sensor output alternates between the ON and OFF states. When two perforations are detected in this manner, the system concludes that a 135 film is fed.



2 The relationships between the film size and sensor output are as indicated below.

	Film Detection Sensor (RSE1/LSE1)	Film Perforation Sensor (RSE2/LSE2)
135 Film	ON	Alternating between ON and OFF
110 Film	ON	OFF
126 Film	ON	ON

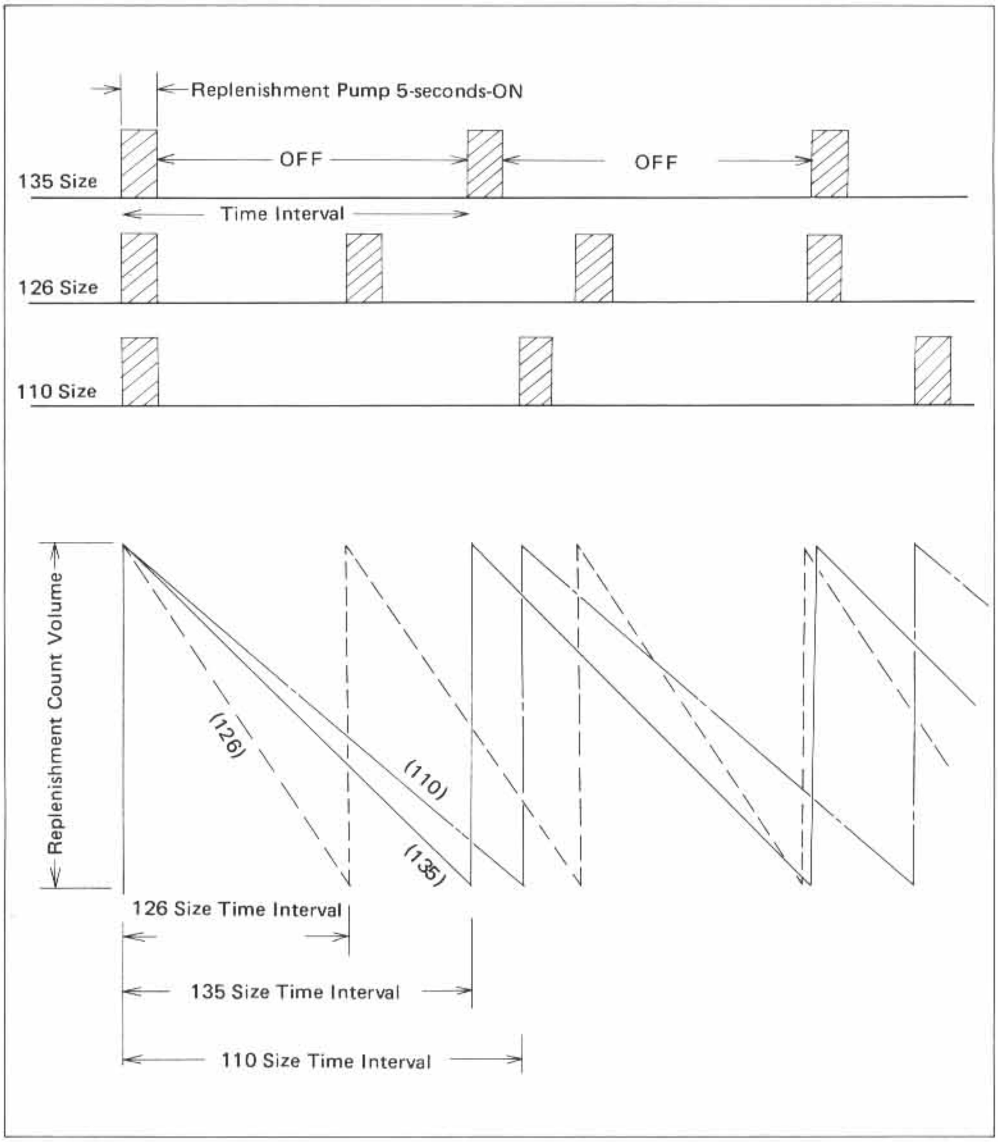
NOTE: Size detection is functional for 110 and 126 film only when the output conditions designated in the table above are maintained continuously for a period of two seconds.

3 The above indicated film size detections are made independently for each of the right- and left-hand strands.

3.6 Replenishment Pump Operational Sequence

3.6.1 Replenishment Pump Operational System

① The replenishment pump operates intermittently.
② One replenishment pump operation lasts 5 seconds.
③ The replenishment pump operates at intervals (pump ON time + pump OFF time) that vary with the film size.
④ Pump ON and OFF times for each film size are as indicated below.



3.6.2 Operational Time Interval Determination

The operational time intervals are determined as follows.

1. Each pump output volume (Q) is determined by data entry in submode 4 of mode 5. The output volume Q relates to 6 complete cycles of 5-seconds-on and 2-seconds-off.
2. The replenishment rate for each replenisher is determined in submode 3 of mode 5.

   NOTE: The replenishment rate setting used, relates to the processing of one 135 24-exposure roll film.

		R	Q
NQ1R	45 mℓ	26.8	120
NQ2R	20 mℓ	08	114
NQ3R	30 mℓ	32.6	122
NQSR	30 mℓ	32.6	128
NQ4R	20 mℓ	32.6	112

3. A built-in program is used to calculate the replenishment count volume from the above indicated pump output volume and replenishment rate.

$$\text{Replenishment Count Volume} = \frac{\text{5-Second Pump Output Volume (Q/6)}}{\text{Replenishment Rate}} \times \frac{\text{Film Length (mm)}}{7.2}$$

   NOTE: The value 7.2 represents the 1-second film feed length (mm).

   Example) When the pump output volume (Q) = 90 mℓ, 135 24-exposure roll film length = 1107 mm, and NQ1R replenishment rate = 45 mℓ, the replenishment count volume for NQ1R is calculated as follows.

$$\text{Replenishment Count Volume} = \frac{90/6}{45} \times \frac{1107}{7.2} = 51.25^{*}$$

   NOTE: Decimal place values beyond the two places indicated by the asterisk (*) designated value above, are dropped.

4. With 135 size film, the replenishment count volume represents the operational time interval (seconds).

   The replenishment count for 135 size film is decremented by 1 every second.

   NOTE: For 126 size film, the count is decremented by 1 every 0.66 second.
   For 110 size film, the count is decremented by 1 every 1.15 seconds.
5. When the replenishment count is decremented to 0 (zero), the replenishment pump operates for a 5 second period.

The replenishment pump operations are programmed as indicated above.

3.6.3 Replenishment Pump Operation

1. When the film detection sensor is ON with the drive system activated, the replenishment count volume for each film size is decremented.
2. When a replenishment count of 0 is reached, the replenishment pump operates once.

   NOTE: When a replenishment count of 0 is reached, the preselected count is restored.
3. The above sequence is repeated until the film detection sensor turns OFF.
4. The above sequence is provided independently for each of the right- and left-hand strands. However, one replenishment counter serves both strands.

   When both the right- and left-strand films are present, the replenishment count is decremented at the decrement intervals specified for each film.

   NOTE 1: One-count decrement intervals are as follows.

   135 size — 1 second
   126 size — 0.66 second
   110 size — 1.15 seconds

NOTE 2: Replenishment Count Decrement Time
After film size determination has been completed, the film detectors (LSE1/RSE1) remains OFF for two seconds with the decrement time being the interval (7 + 2 seconds) until the end of film size determination.

3.7 Film Trailing End Pressure Solenoid (SOL3/SOL4) ON/OFF

< Solenoid ON Conditions >
① Film is being processed (with the drive system ON).
② Film feed section cover detection microswitch (S5) is ON.

1. When the magazine is moved as a result of pulling, the film trailing end pressure detection microswitch (S9/S10) goes ON.
   - Film trailing end pressure solenoid (SOL3/SOL4) goes ON.
2. When the film is cut, the film trailing end pressure detection microswitch goes OFF.
3. When the film trailing end pressure detection microswitch goes OFF, the pressure solenoid goes OFF.

3.8 Film Cut Sequence

< Cutter Operational Conditions >
① Drive system is activated.
② Film feed section cover detection microswitch (S5) is ON.
③ Film trailing end pressure detection microswitch (S9/S10) is ON.

1. When the film cut detection microswitch (S6/S7) stays ON for 0.1 second, the cutter solenoid (SOL1/SOL2) actuates to cut the film.
2. When the cutter operation lasts 0.5 second or the film cut detection microswitch stays OFF for 0.1 second, the cutter solenoid goes OFF.
3. If the film cut detection microswitch stays ON for 0.3 second after cutter operation, the system causes the cutter to operate again.

NOTE: The above sequence is provided independently for each of the right- and left-hand strands.

3.9 Film Length Detection

1. One film length count is equivalent to the time interval between the instant at which the film detection sensor (LSE1/RSE1) completes a 2-seconds-ON cycle and the instant at which the same sensor completes a 2-seconds-OFF cycle. Film length counting is conducted on this basis.
2. If the film length count exceeds the predetermined limit, the following error message appears on the display.

E34 (or E35) R (or L): Film
Length Abnormal. Check

Film Length (mm)

135	110	126
1662	862	951

3. The above sequence is provided independently for each of the right- and left-hand strands.

3.10 Drive Stop

1. When the STOP switch is pressed, the following sequence is initiated.
   - Drive system stops.
   - Dryer heater (H7) turns off.
   - Dryer fan (FAN1) stops 30 seconds after drive system and dryer heater turn-off.

   If the STOP switch is pressed during film processing or within 12 minutes and 30 seconds after film trailing end detection, the following error message appears on the display.

   E23 Film Being
   Processed

2. If no film detection is made within 12 minutes and 30 seconds after START switch turn-ON, the drive system comes to a stop.
3. If the POWER switch is turned OFF during film processing, the power remains on to keep the drive system activated. In such a case, however, the following error message appears on the display.

   E23 Film Being
   Processed

   Pressing the STOP switch under these conditions turns off the power.
   If under these conditions the STOP switch is pressed and the processing section cover is opened, the power goes OFF.

   Processing Section
   Uncovered Y

   If the processing cover section cover is closed and the power is turned OFF, the sequence is the same as that pertaining after automatic shutoff.

   NOTE: In cases where the E32/E33 cut flow alarm has been activated, the power goes OFF even if the processing section cover remains closed.

4. ALARM INDICATIONS AND REMEDIES

4.1 Clearing the Alarms

Some alarms can be cleared simply by the appropriate keying operations, but others cannot be cleared until the related problem causes are eliminated.

(1) Error Messages Cleared by Keying Operations

These alarms are identified by intermittent sound signals and error message displays.

< Alarm Clearing Procedures >

1. Press any key to silence the alarm.
2. Press the YES key. This causes the error message to disappear.
   However, if problem conditions are not eliminated, the alarm will sound again. Alarm generation timing is as indicated below.

Error Message	Detection Timing
E00 ~ E01 (waste solution retention tank) E10 ~ E14 (low replenisher level)	Check is performed at 5 minute intervals.
E20 ~ E23 (covers)	Interrupts are initiated as required by cover detection microswitch ON/OFF.
E30 ~ E39 (film cutting) E40 ~ E41 (magazine return failure)	These errors occur only in the film cutting sequence.
E42 ~ E45 (film sensor failure)	Check is performed when the drive system is OFF.
E46 ~ E47 (film sensor failure)	Check is performed when the drive system is ON.

AL-20 Error Message	Detection Timing
E05, E48, E49	Check with Automatic Loading Start (YES key ON).
E26, E27, E91	Check with Automatic Loading Leader Detection.
E25	Check with Drive ON.

(2) Error Messages Not Cleared by Keying Operations

These alarms are identified by continuous sound signals and error message displays.

< Alarm Clearing Procedures >

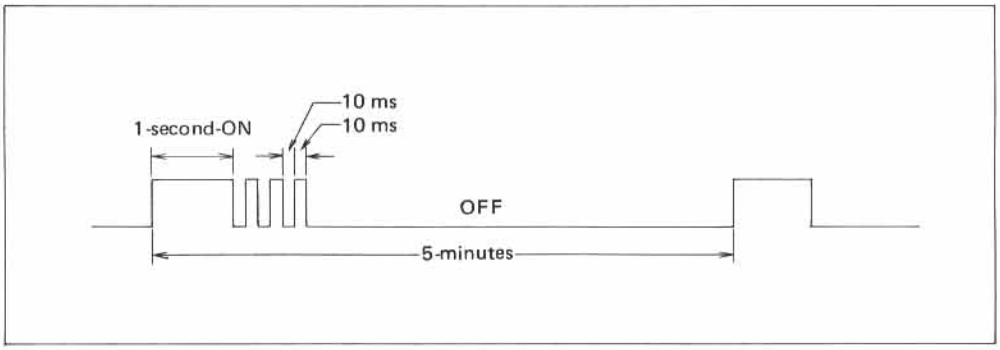
1. Press any key to silence the alarm.
2. Turn OFF the POWER switch.
3. Eliminate the problem cause.
4. Turn ON the POWER switch and resume normal operations.

Alarm generation timing is as indicated below.

Error Message	Detection Timing
E50 ~ E57 (temperature sensor failure)	When the E50 ~ E57 processing solution temperature sensors fail during drive functions, only the 200 V power to the heater for which the alarm was generated is cut. The 200 V power to the other heaters remains constant. However, if the drive STOP switch is pressed, or after automatic shutoff all of the 200 V power is cut. When the drive is off there is an alarm generation and the 200 V power system is cut. When the E57 dryer temperature sensors fail, the 200 V power to the dryer section and processing solution heaters is cut irrespective of the drive ON/OFF conditions.
E60 ~ E66 (heater burnout)	When the E60 ~ E65 processing solution heaters fail, only the 200 V power to the heater for which the alarm was generated is cut. The 200 V power to the other heaters remains constant. When the drive is OFF there is an alarm generation and the 200 V power system is cut. When the E66 dryer heater burns out, the 200 V power to the dryer section and the processing solution heaters is cut.
E70 (low solution level)	When this alarm is generated, the 200 V power is cut regardless of the drive function status.
E80 ~ E86 (temperature abnormality)	When the E80 ~ E85 processing solution temperature alarm is generated during drive functions, the 200 V power remains ON until the processing solution temperature exceeds 45 degrees centigrade. After the 45 degree level is exceeded only the 200 V power to the heater for which the alarm was generated is cut. When the drive is OFF under alarm generation circumstances all 200 V sources to the processing solutions are cut. When the E86 dryer temperature abnormality alarm is generated, the 200 V system power is cut and the alarm sounds irrespective of the drive system ON/OFF status.

4.2 Replenisher Tank Solution Level Check

1. Electrode is read for 1 second at 5 minute intervals to check the replenisher level.
   Then following that solution level checks are made for three more time at 10 ms intervals.
   If each of the three checks conclude that there is no solution left the alarm sounds.



2. When an unduly low replenisher tank solution level is detected, such condition is indicated by the following error message.

```
E10 ~ E14  NQ1 ~ NQ4
Replenisher Level Too Low
```

NOTE: If the replenisher level becomes too low during detector inactivity, the alarm is generated with the next electrode reading.

4.3 Film Detection/Film Perforation Sensor Abnormalities

1. If the film detection sensor (LSE1/RSE1) goes ON during drive system inactivity, such is indicated by the following error message.

```
E44/E45 R/L: Film Sensor
Failure
```

2. If the film perforation sensor (LSE2/RSE2) goes ON under the same conditions as in paragraph 1, such is indicated by the following error message.

```
E42/E43 R/L: Perforation
Sensor Failure
```

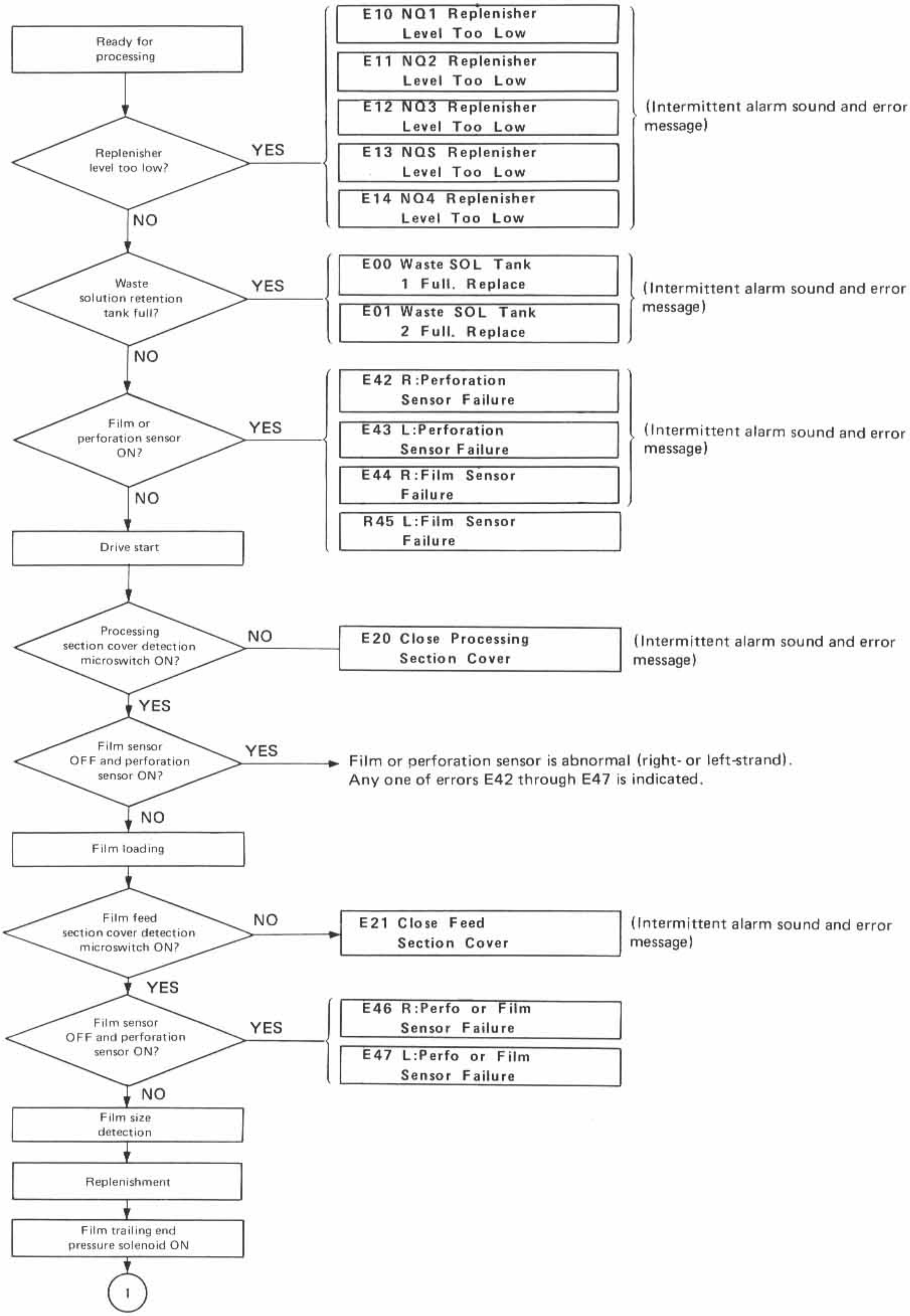
3. If the film detection sensor goes OFF with the film perforation sensor ON during drive system activity, such is indicated by the following error message.

```
E46/E47 R/L: Perfo or Film
Sensor Failure
```

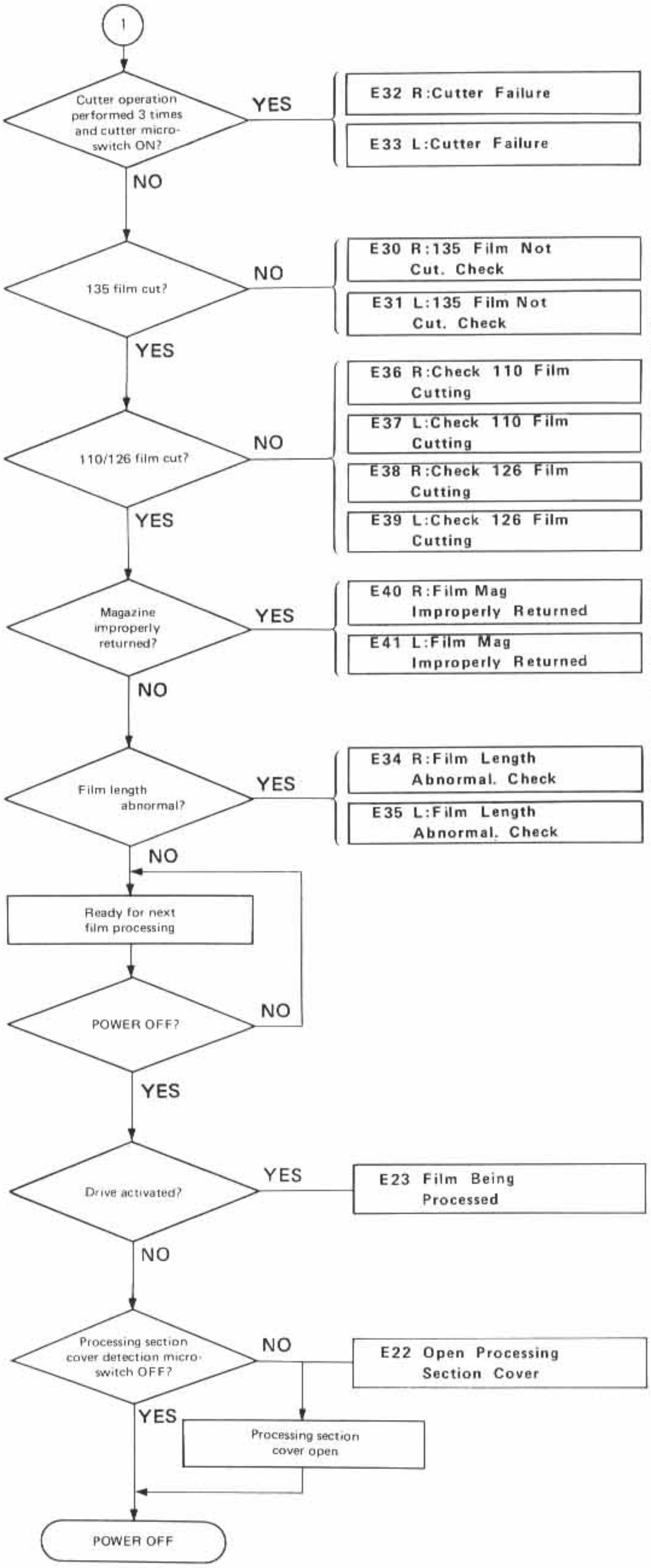
4. The above indicated sequences are provided independently for each of the right- and left-hand strands.

4.4 Film Processing Error Detection Routine

4.4.1 FP350 Film Processing Error Detection Routine 1


Ready for processing
Replenisher level too low?
YES
E10 NQ1 Replenisher Level Too Low
E11 NQ2 Replenisher Level Too Low
E12 NQ3 Replenisher Level Too Low
E13 NQS Replenisher Level Too Low
E14 NQ4 Replenisher Level Too Low
(Intermittent alarm sound and error message)
NO
Waste solution retention tank full?
YES
E00 Waste SOL Tank 1 Full. Replace
E01 Waste SOL Tank 2 Full. Replace
(Intermittent alarm sound and error message)
NO
Film or perforation sensor ON?
YES
E42 R:Perforation Sensor Failure
E43 L:Perforation Sensor Failure
E44 R:Film Sensor Failure
R45 L:Film Sensor Failure
(Intermittent alarm sound and error message)
NO
Drive start
Processing section cover detection microswitch ON?
NO
E20 Close Processing Section Cover
(Intermittent alarm sound and error message)
YES
Film sensor OFF and perforation sensor ON?
YES
Film or perforation sensor is abnormal (right- or left-strand).
Any one of errors E42 through E47 is indicated.
NO
Film loading
Film feed section cover detection microswitch ON?
NO
E21 Close Feed Section Cover
(Intermittent alarm sound and error message)
YES
Film sensor OFF and perforation sensor ON?
YES
E46 R:Perfo or Film Sensor Failure
E47 L:Perfo or Film Sensor Failure
NO
Film size detection
Replenishment
Film trailing end pressure solenoid ON
1

FP350 Film Processing Error Detection Routine 2


1
Cutter operation performed 3 times and cutter micro-switch ON?
YES
E32 R:Cutter Failure
E33 L:Cutter Failure
NO
135 film cut?
NO
E30 R:135 Film Not Cut. Check
E31 L:135 Film Not Cut. Check
YES
E36 R:Check 110 Film Cutting
E37 L:Check 110 Film Cutting
110/126 film cut?
NO
E38 R:Check 126 Film Cutting
E39 L:Check 126 Film Cutting
YES
Magazine improperly returned?
YES
E40 R:Film Mag Improperly Returned
E41 L:Film Mag Improperly Returned
NO
Film length abnormal?
YES
E34 R:Film Length Abnormal. Check
E35 L:Film Length Abnormal. Check
NO
Ready for next film processing
POWER OFF?
NO
YES
Drive activated?
YES
E23 Film Being Processed
NO
Processing section cover detection micro-switch OFF?
NO
E22 Open Processing Section Cover
YES
Processing section cover open
POWER OFF

(Intermittent alarm sound and error message)

(Intermittent alarm sound and error message)

Although the 135 film has not been cut, the film detection sensor has gone OFF.

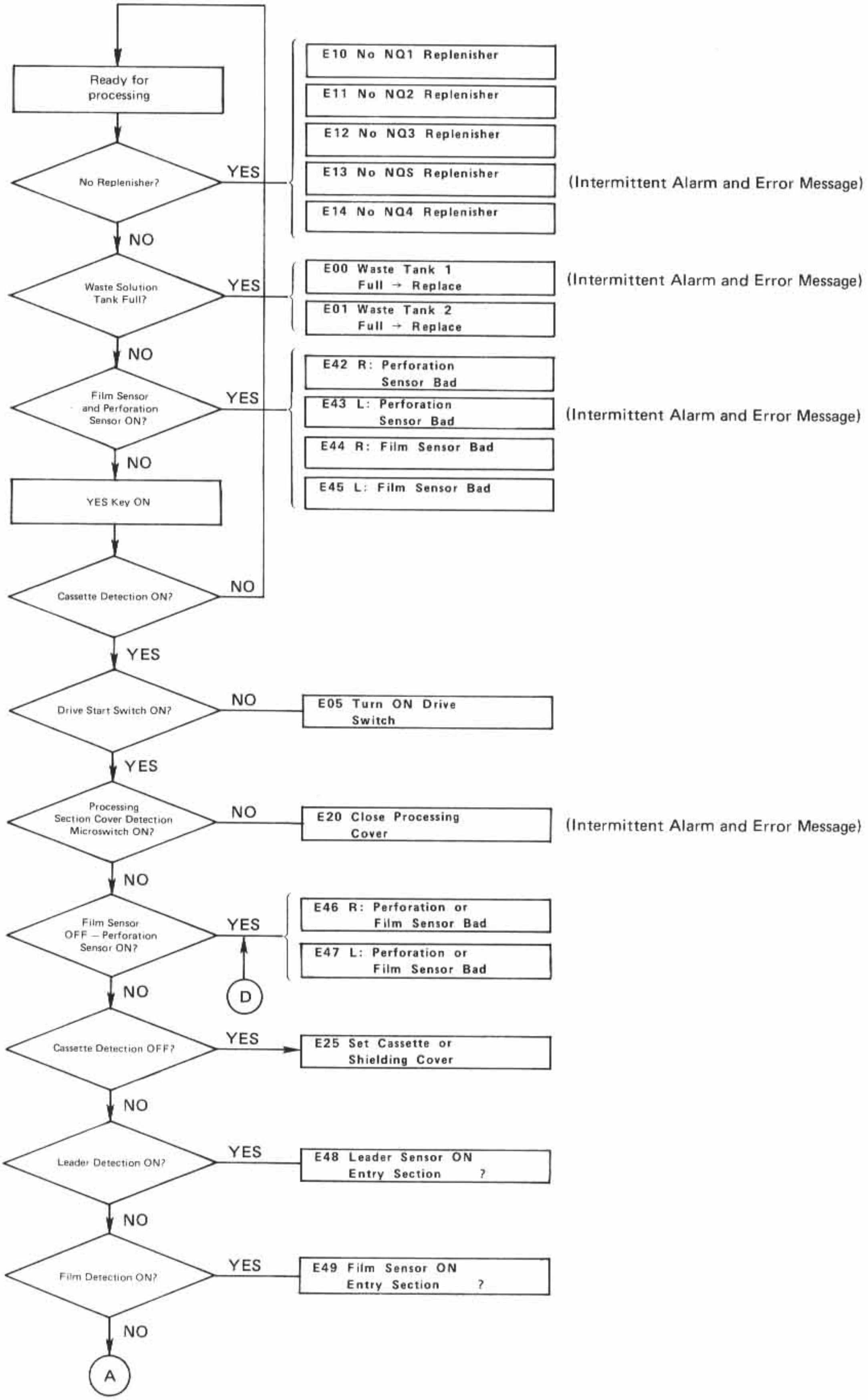
(Intermittent alarm sound and error message)

(Intermittent alarm sound and error message)

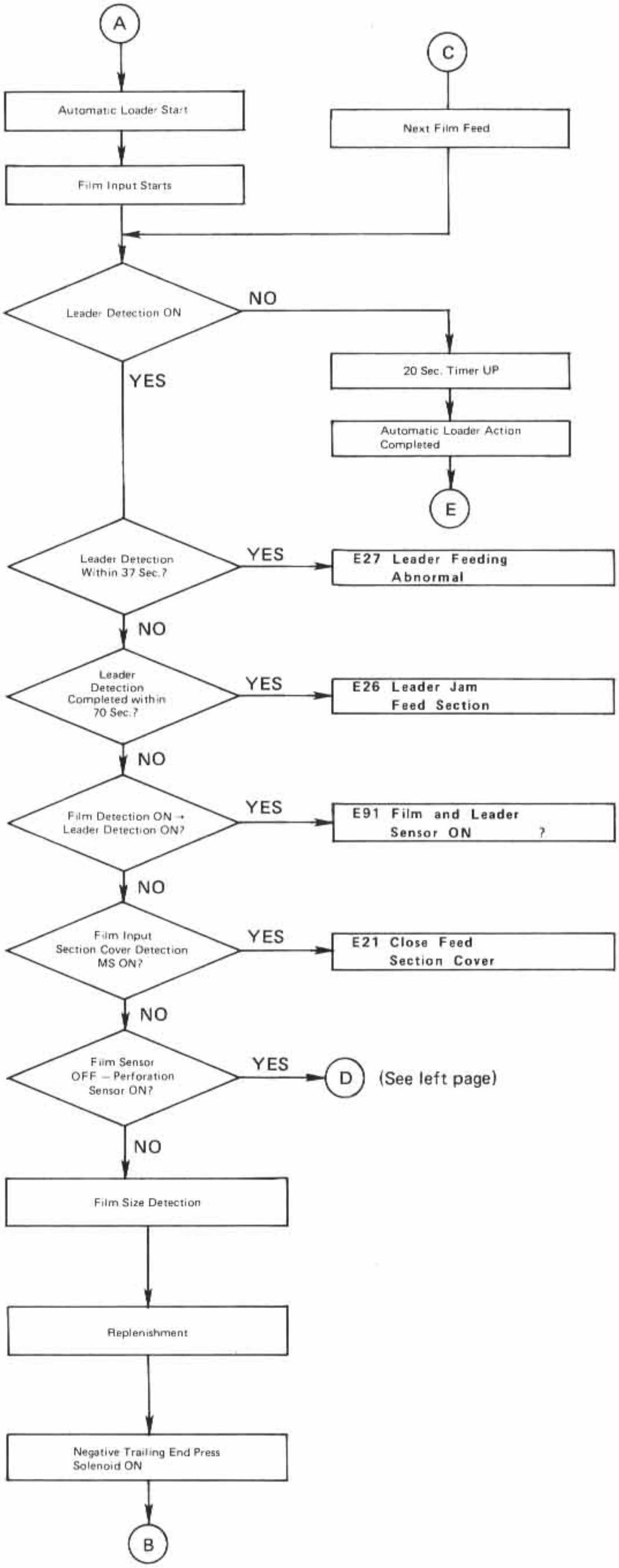
Film trailing and pressure detection microswitch has remainted ON for 5 seconds.

(Intermittent alarm sound and error message)

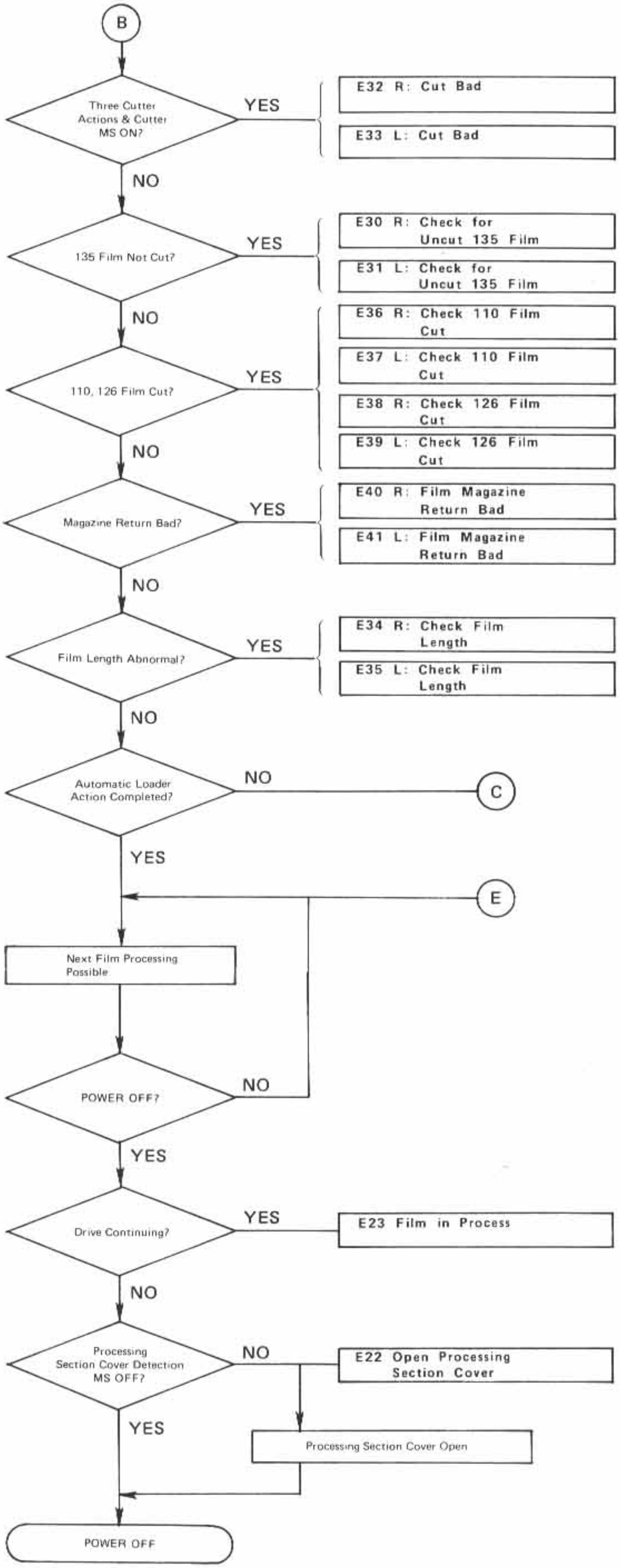
4.4.2 FP350AL Film Processing Error Detection Routine 1


Ready for processing
No Replenisher?
YES
NO
E10 No NQ1 Replenisher
E11 No NQ2 Replenisher
E12 No NQ3 Replenisher
E13 No NQS Replenisher
E14 No NQ4 Replenisher
(Intermittent Alarm and Error Message)
Waste Solution Tank Full?
YES
NO
E00 Waste Tank 1 Full → Replace
E01 Waste Tank 2 Full → Replace
(Intermittent Alarm and Error Message)
Film Sensor and Perforation Sensor ON?
YES
NO
E42 R: Perforation Sensor Bad
E43 L: Perforation Sensor Bad
E44 R: Film Sensor Bad
E45 L: Film Sensor Bad
(Intermittent Alarm and Error Message)
YES Key ON
Cassette Detection ON?
NO
YES
Drive Start Switch ON?
NO
E05 Turn ON Drive Switch
YES
Processing Section Cover Detection Microswitch ON?
NO
E20 Close Processing Cover
(Intermittent Alarm and Error Message)
NO
Film Sensor OFF – Perforation Sensor ON?
YES
E46 R: Perforation or Film Sensor Bad
E47 L: Perforation or Film Sensor Bad
D
NO
Cassette Detection OFF?
YES
E25 Set Cassette or Shielding Cover
NO
Leader Detection ON?
YES
E48 Leader Sensor ON Entry Section ?
NO
Film Detection ON?
YES
E49 Film Sensor ON Entry Section ?
NO
A

FP350AL Film Processing Error Detection Routine 2


A
C
Automatic Loader Start
Next Film Feed
Film Input Starts
Leader Detection ON
NO
YES
20 Sec. Timer UP
Automatic Loader Action Completed
E
Leader Detection Within 37 Sec.?
YES
E27 Leader Feeding Abnormal
NO
Leader Detection Completed within 70 Sec.?
YES
E26 Leader Jam Feed Section
NO
Film Detection ON → Leader Detection ON?
YES
E91 Film and Leader Sensor ON ?
NO
Film Input Section Cover Detection MS ON?
YES
E21 Close Feed Section Cover
NO
Film Sensor OFF – Perforation Sensor ON?
YES
D
(See left page)
NO
Film Size Detection
Replenishment
Negative Trailing End Press Solenoid ON
B

FP350AL Processing Error Detection Routine 3


B
Three Cutter Actions & Cutter MS ON?
YES
E32 R: Cut Bad
E33 L: Cut Bad
NO
135 Film Not Cut?
YES
E30 R: Check for Uncut 135 Film
E31 L: Check for Uncut 135 Film
NO
110, 126 Film Cut?
YES
E36 R: Check 110 Film Cut
E37 L: Check 110 Film Cut
E38 R: Check 126 Film Cut
E39 L: Check 126 Film Cut
NO
Magazine Return Bad?
YES
E40 R: Film Magazine Return Bad
E41 L: Film Magazine Return Bad
NO
Film Length Abnormal?
YES
E34 R: Check Film Length
E35 L: Check Film Length
NO
Automatic Loader Action Completed?
NO
C
YES
E
Next Film Processing Possible
POWER OFF?
NO
YES
Drive Continuing?
YES
E23 Film in Process
NO
Processing Section Cover Detection MS OFF?
NO
E22 Open Processing Section Cover
Processing Section Cover Open
YES
POWER OFF

(Intermittent Alarm and Error Message)

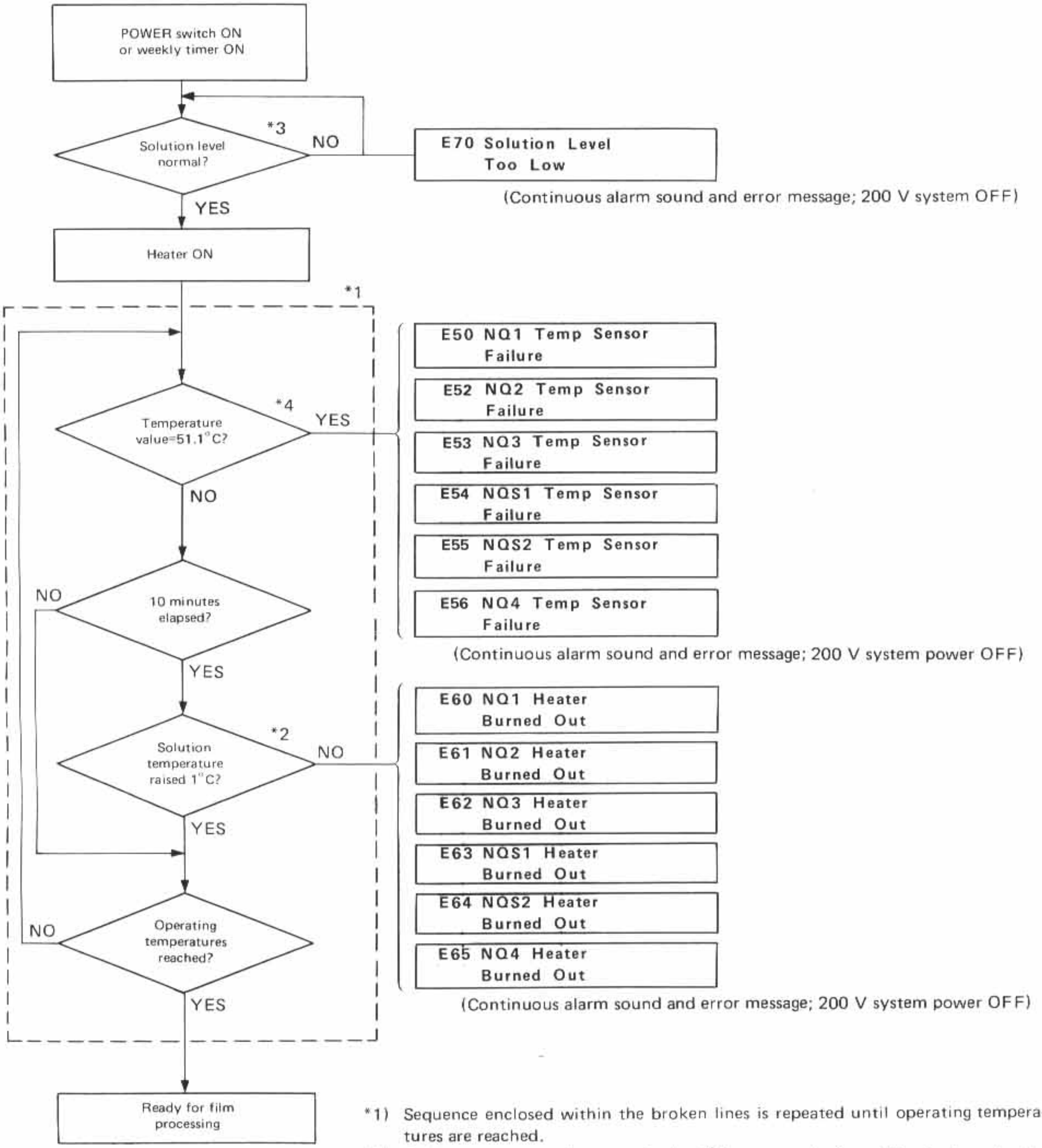
(Intermittent Alarm and Error Message)
135 was not cut and the film sensor was OFF.

(Intermittent Alarm and Error Message)

(Intermittent Alarm and Error Message)
Film trailing end pressure detection microswitch was on continuously for more than five seconds.

(Intermittent Alarm and Error Message)

4.5 Processing Solution Error Detection Routine 1


POWER switch ON
or weekly timer ON
Solution level normal?
*3
NO
YES
E70 Solution Level Too Low
(Continuous alarm sound and error message; 200 V system OFF)
Heater ON
*1
Temperature value=51.1°C?
*4
YES
NO
E50 NQ1 Temp Sensor Failure
E52 NQ2 Temp Sensor Failure
E53 NQ3 Temp Sensor Failure
E54 NQS1 Temp Sensor Failure
E55 NQS2 Temp Sensor Failure
E56 NQ4 Temp Sensor Failure
(Continuous alarm sound and error message; 200 V system power OFF)
10 minutes elapsed?
NO
YES
Solution temperature raised 1°C?
*2
NO
YES
E60 NQ1 Heater Burned Out
E61 NQ2 Heater Burned Out
E62 NQ3 Heater Burned Out
E63 NQS1 Heater Burned Out
E64 NQS2 Heater Burned Out
E65 NQ4 Heater Burned Out
(Continuous alarm sound and error message; 200 V system power OFF)
Operating temperatures reached?
NO
YES
Ready for film processing

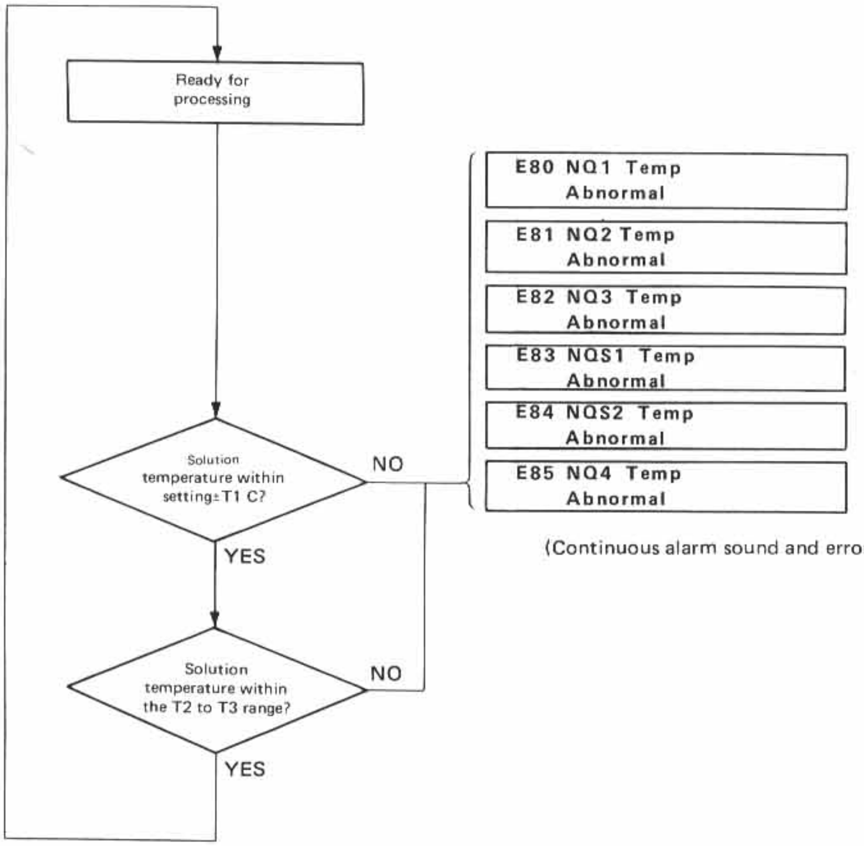
*1) Sequence enclosed within the broken lines is repeated until operating temperatures are reached.

*2) If the temperature does not rise by 1°C or more during a 10 minute period in the heatup (operating temperature buildup) state, the system concludes that the heater is burned out and then generates the associated error message.
NOTE: This check is not provided after operating temperatures are reached.

*3) The solution level detection system is allowed to initiate interrupts at all times so that the solution level alarm is generated whenever the solution level detection float switch goes ON.

*4) When the temperature sensor detection value has become 1, the sensor abnormality alarm sounds which usually indicates that interruption processing is taking place.
Detection Value 1 = 51.1°C

Processing Solution Error Detection Routine 2



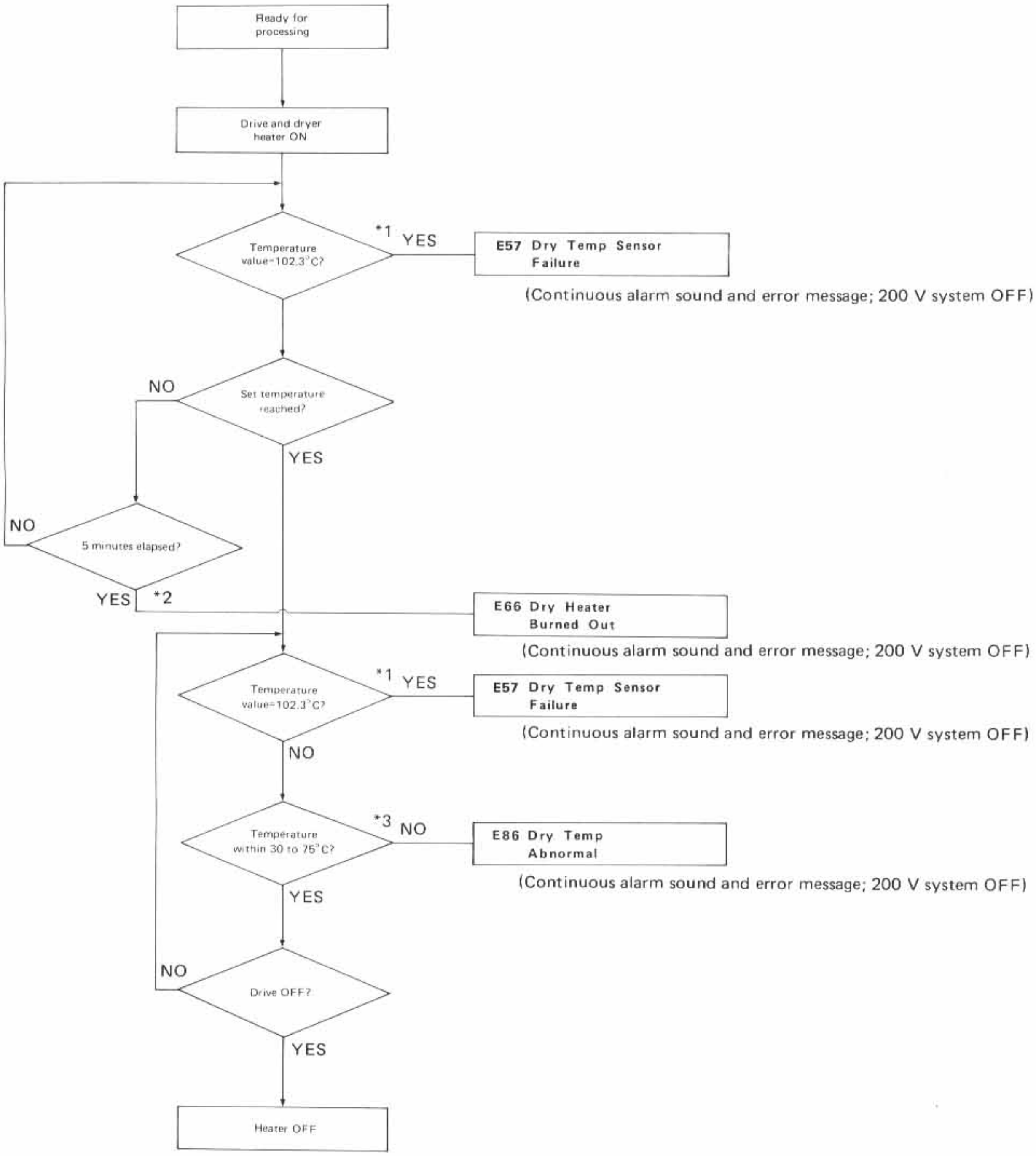
(Continuous alarm sound and error message; 200 V system OFF)

If the solution temperature reached after heatup is outside a set point range of ±T1°C or has exceeded the lower or upper limits (T2 or T3), the associated temperature error message is generated. Temperatures T1, T2, and T3 are as indicated below.

	NQ1	NQ2	NQ3	NQS	NQ4
T1 (°C)	1	–	–	–	–
Lower Limit Temperature T2 (°C)	–	33	33	32 *	33
Upper Limit Temperature T3 (°C)	42	43	43	38 *	43
Temperature Setting Range (°C)	36.0 – 40.0	33 – 43	33 – 43	33 – 43	33 – 43

* Version 6.3 and above: { T2 30°C
T3 40°C

4.6 Dryer Error Detection Routine


Ready for processing
Drive and dryer heater ON
Temperature value=102.3°C?
*1 YES
E57 Dry Temp Sensor Failure
(Continuous alarm sound and error message; 200 V system OFF)
NO
Set temperature reached?
YES
NO
5 minutes elapsed?
YES
*2
E66 Dry Heater Burned Out
(Continuous alarm sound and error message; 200 V system OFF)
Temperature value=102.3°C?
*1 YES
E57 Dry Temp Sensor Failure
(Continuous alarm sound and error message; 200 V system OFF)
NO
Temperature within 30 to 75°C?
*3 NO
E86 Dry Temp Abnormal
(Continuous alarm sound and error message; 200 V system OFF)
YES
NO
Drive OFF?
YES
Heater OFF

*1) Dryer error detection system is allowed to initiate interrupts at all times so that the alarm is generated when the temperature sensor reading is 1.
The value 1 is equal to 102.3°C (216.1°F).

*2) If the preset dryer temperature is not reached within 5 minutes after drive system turn-on, the system concludes that the heater is burned out and then generates the error message. The acceptable temperature setting range is 30 to 75°C (86 to 167°F).
NOTE: This check is not provided after the preset temperature is reached.

*3) If the dryer temperature is outside 30 to 75°C (86 to 167°F) after the preset temperature has been reached, the system concludes that a temperature abnormality has occurred and then generates the associated error message.

5. COMPONENT REPLACEMENT AND CHECKOUT

< Replacement Precautions >

1. Before attempting component replacements, be sure to turn off the POWER switch and then the circuit breaker.
2. When removing a processing rack from its tank, cover the other tanks to prevent solution spillover from one tank to the others.
3. Removed screws should be kept in a case or the like so as not to lose track of them.
4. When installing components such as those associated with the replenisher tank section, ensure that signal and other wires do not get caught.

< Tool Required >

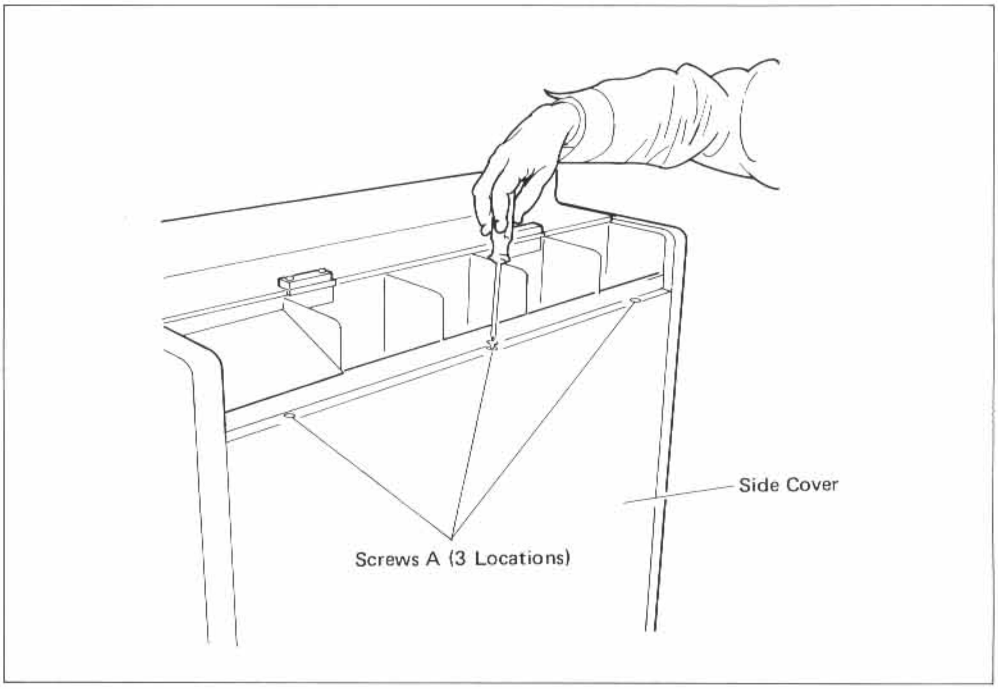
1. Phillips Screwdriver
2. Regular Screwdriver
3. Stubby Screwdriver
4. Gripping Pliers
5. Lineman Pliers
6. Pinch Cock
7. Pin Removal Jig
8. 3 kg Tension Gauge
9. 10 kg Tension Gauge
10. Torque Driver

< Materials Required >

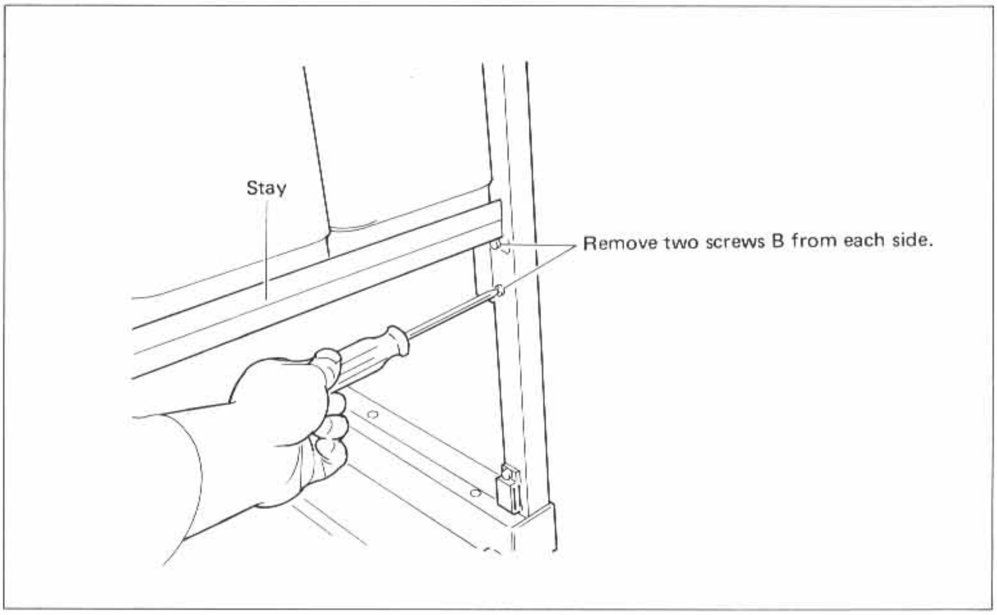
Screw Locking Bond
Wire Binder
PVC Adhesive

5.1 Replenisher Tank Electrode Level Sensor Replacement

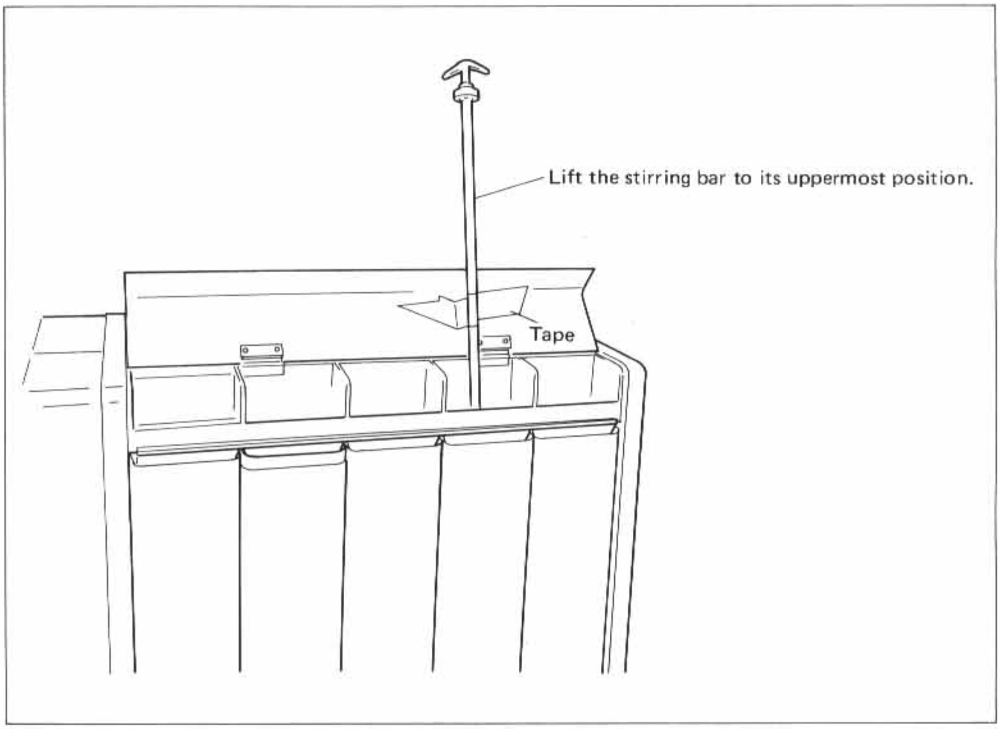
1. Remove waste solution retention tanks 1 and 2 from the processor.
2. Drain all replenisher solutions (NQ1-R through NQ4-R).
3. Remove screws A (3 locations) and then the side cover.



4. Remove screws B (two on each side) and then the stay.

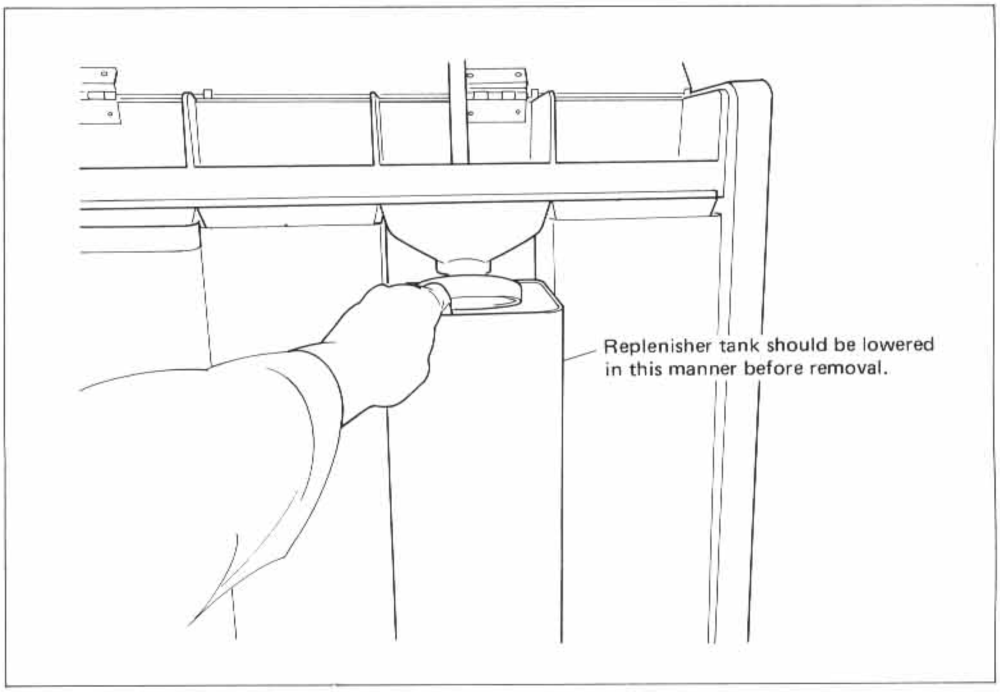


5. Lift the stirring bar to the uppermost position and tape it to the cover.

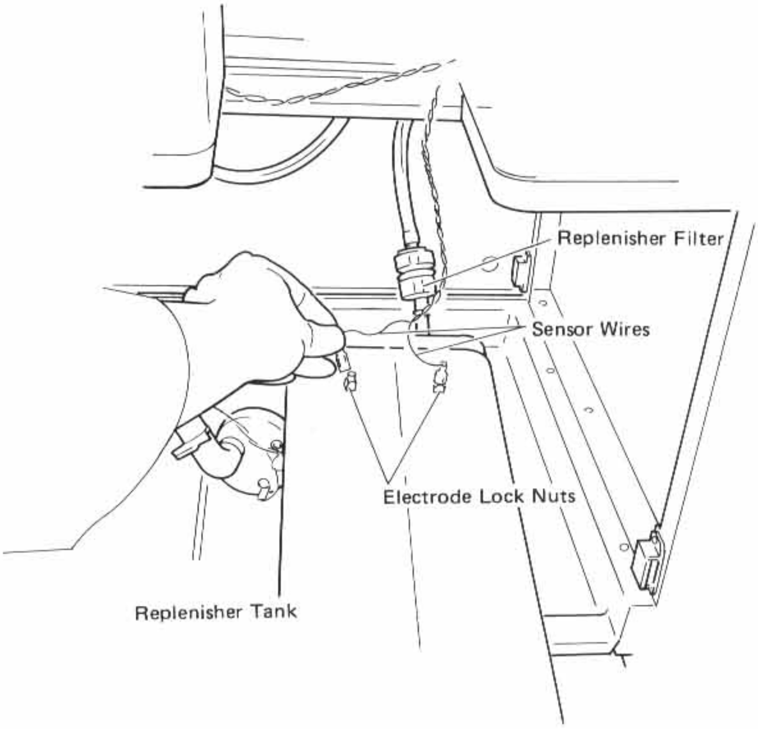


6. Withdraw the bottom of the replenisher tank forward, lower it downward, and lay it on its side.

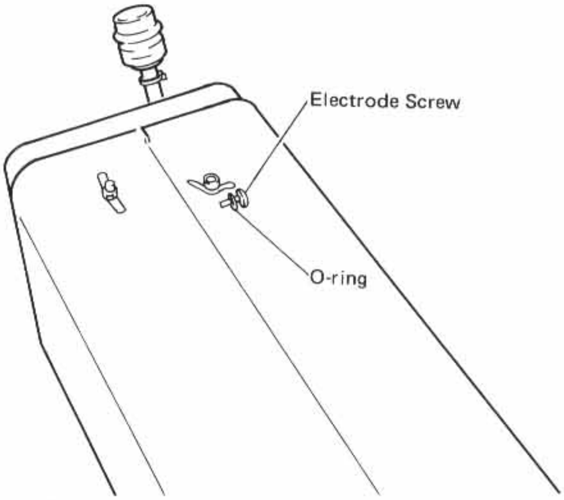
   CAUTION: Use care not to cut off the sensor wires.


Replenisher tank should be lowered in this manner before removal.

7. Disconnect the sensor wire fastening terminal.
8. Remove the replenisher filter from the center of the tank, then take out the replenisher tank.



9. Retain the nut with lineman pliers, then with a stubby Phillips screwdriver remove the electrode screw (SUS316, M4 x 10 truss head screw) from inside the tank.



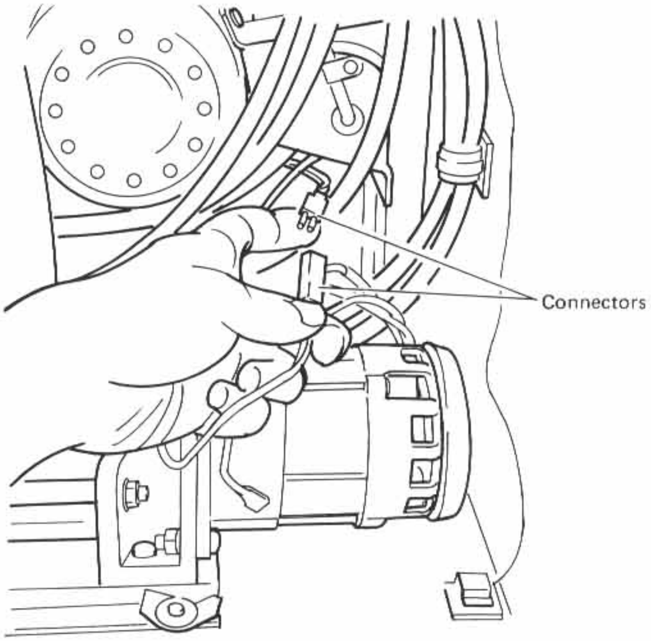
10. Replace the electrode, then mount the new electrode on the replenisher tank.
    NOTE: Do not fail to reinstall or replace the O-ring.
11. Clamp the replenisher hose with a pinch cock or like device, then pour about 2 liters of water into the tank to check for any leaks around the electrode section.
12. When watertightness is verified, drain the water and complete reinstallation using a procedural order that is the reverse of removal.

< Post-replacement Checkout >

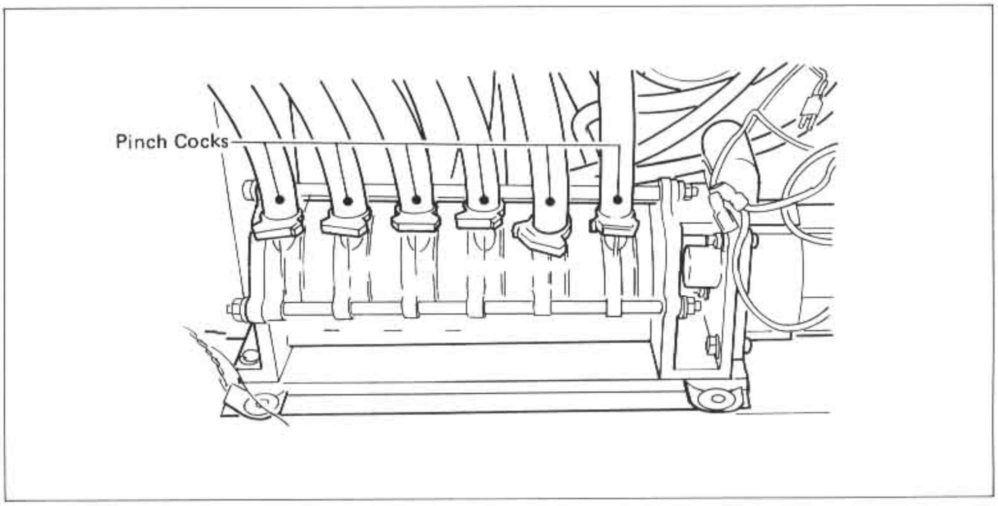
1. With the replenisher tanks emptied of solutions, turn on the POWER switch to check whether the errors E10 through E14 (REPLENISHER LEVEL TOO LOW) occur.
2. Turn off the POWER switch, pour about 2 liters of the solutions into the replenisher tanks, and turn the POWER switch back on to ensure that none of errors E10 through E14 occur (REPLENISHER LEVEL TOO LOW).
3. Add the necessary replenisher solution amounts and resume processing operations.
   NOTE: To perform checkouts of associated circuit boards, see under Replenisher Tank Solution Level Sensor Output in section 7.2.1.

5.2 Circulation Pump Unit Replacement (Drive Motor Included)

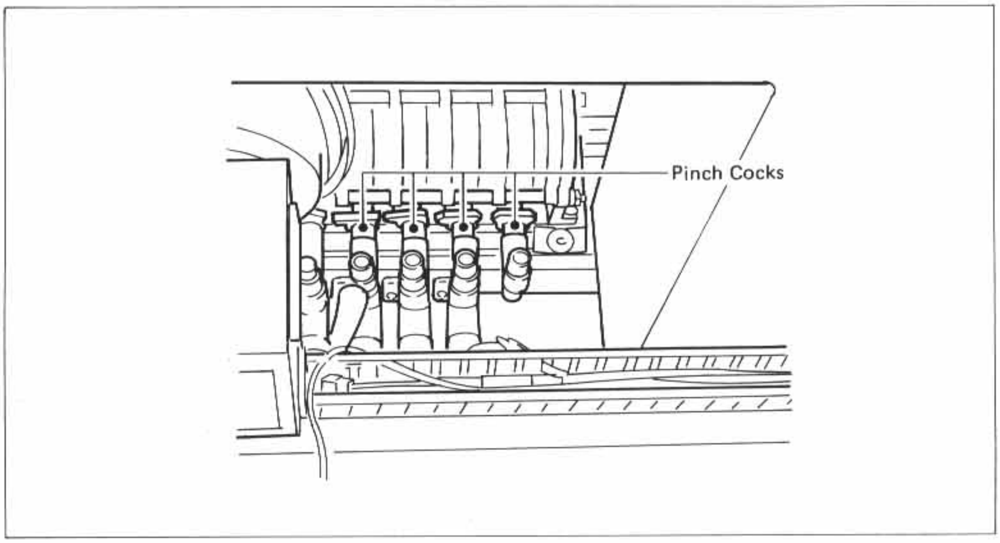
1. Drain all replenisher solutions (NQ1-R to NQ4-R).
2. Carry out the same procedures 1 through 8 as indicated in section 5.1.
   NOTE 1: Remove at least the three NQ3R, NQSR, and NQ4R replenisher tanks.
   NOTE 2: Dress the removed sensor wires in the direction of the NQ1R replenisher tank.
3. Separate the circulation pump drive motor power connectors.



4. Using the pinch cocks close the hoses to the circulation pump inlets (6 locations).

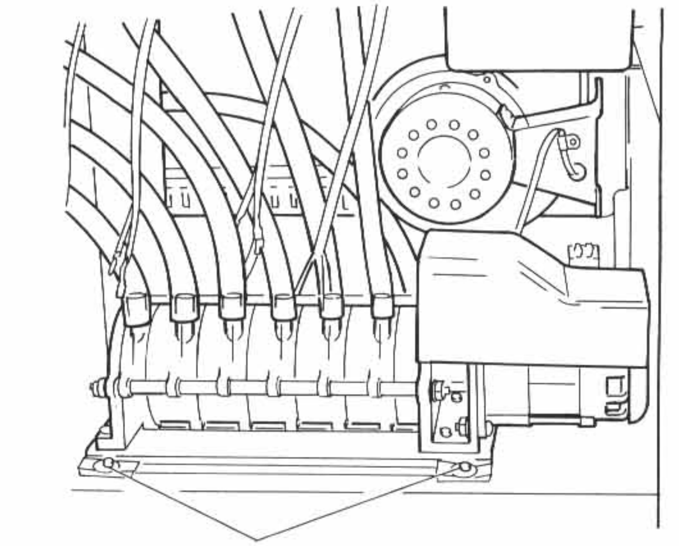


5. Remove the hose bands and then the hoses from the circulation pump.
   NOTE: If there are any solution spills, wipe them up completely.
6. Complete steps 1 through 5 in section 5.23.
7. Using the pinch cocks close the hoses to the circulation pump outlets (7 locations).
   NOTE: The pinch cocks are closed above the waste solution cocks.

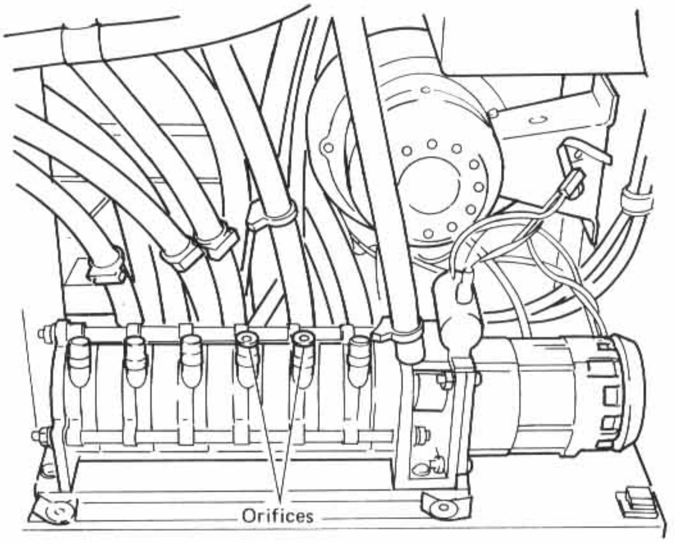


8. After step 7, remove the hose bands and remove the hoses from the waste solution cocks.
   NOTE: If there are any solution spills, wipe them up completely.
9. Remove the waste solution cock retention screws.

10. Remove the four screws retaining the circulation pump unit and remove the circulation pump unit with the waste solution cocks.


Mounting Screws (There are another two screws at the opposite end.)

11. Drain all the solution from inside the circulation pump.
12. Remove the waste solution cocks from the circulation pump and install a new circulation pump.
13. Remove the orifices from the NQS1 and NQS2 circulation pump inlets and install them on the new pump unit.



14. Using procedures that are the reverse of removal, reinstall the pump unit.

NOTE: Replenisher tank replacement is to take place only after post-pump replacement checks have been carried out.

< **Hose Attachment Precautions** >

1 Insure that the hoses are pressed up to the hilt of the circulation pump nozzles.
2 With a pair of pliers ensure that the hose bands are properly positioned without strain or twisting.

< **Post-replacement Checkout** >

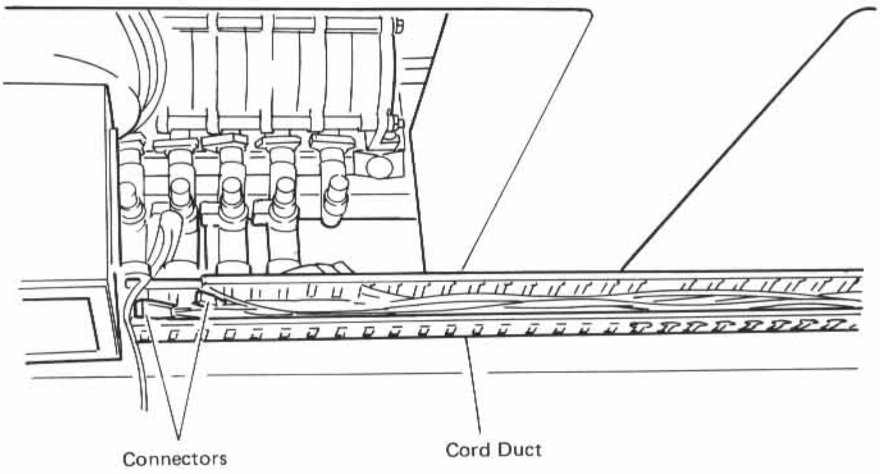
1. Charge the processor with water and turn on the POWER switch.
   1 Make sure that the water circulates through all processing tanks.
   2 Ensure that the NQ1 circulation flow rate is 5.5 to 6.0 l/min (6.5 to 7 l/min in 60 Hz areas).
2. After about 30 minutes of circulation, ensure that no water leaks occur at the circulation pump hose joints.
3. After the above checkout has been completed, drain the water, reinstall the replenisher tanks, perform chemical mixing, and continue with other essential steps.

   NOTE: Processing racks should be cleaned before they are set in their respective tanks.

5.3 Replenishment Pump Replacement

1. Take out waste solution retention tanks 1 and 2.
2. Remove the upper and lower covers from the replenishment pump section.
3. Remove the replenisher filter from the middle of the line and then with a pinch cock, clamp the hose on the replenisher tank side to prevent solution leakage.

   NOTE: If a pinch cock is not available, drain the replenisher solution.
4. Disconnect the replenishment pump cord from the intermediate connector which is located inside the cord duct.

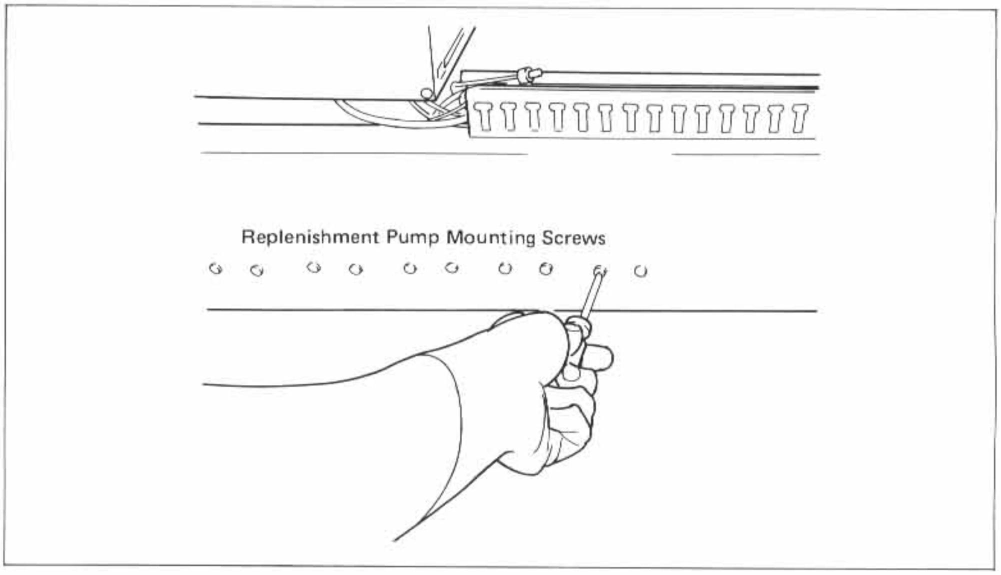


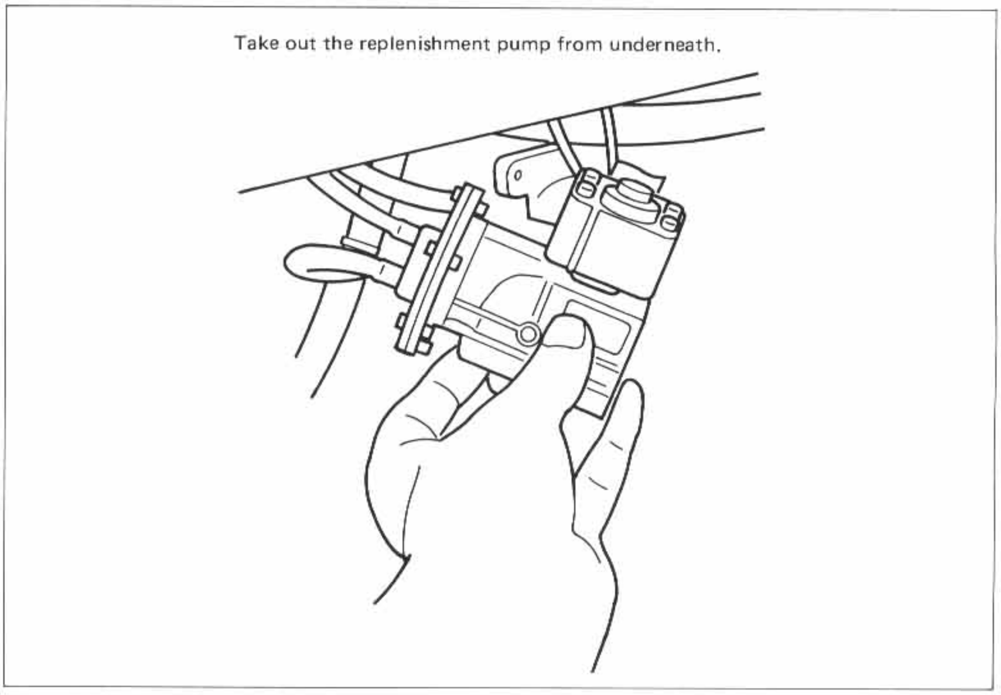
Connector Colors

The connectors are color-identified to indicate the associated processing solutions.

NQ1 – Red
NQ2 – Brown
NQ3 – Yellow
NQS – Black
NQ4 – Green

5. Take out the replenishment pump from below after removing its mounting screws.





NOTE: If replenishment pump removal is difficult, unscrew an adjacent pump beforehand.

6. Disconnect the hoses from the replenishment pump.

   NOTE: Hoses are secured to pump inlet or outlet nozzles with a wire binder.

7. Connect the hoses, which were disconnected in step 6, to a new replenishment pump. Be sure to secure the hoses with wire binders.

   NOTE 1: Be sure that the hose ends are pressed all the way to the hilt of pump inlet and outlet nozzles.

   NOTE 2: Connect the replenisher tank hose to the IN nozzle and the subtank hose to the OUT nozzle.

8. Install the new replenishment pump in the processor body.

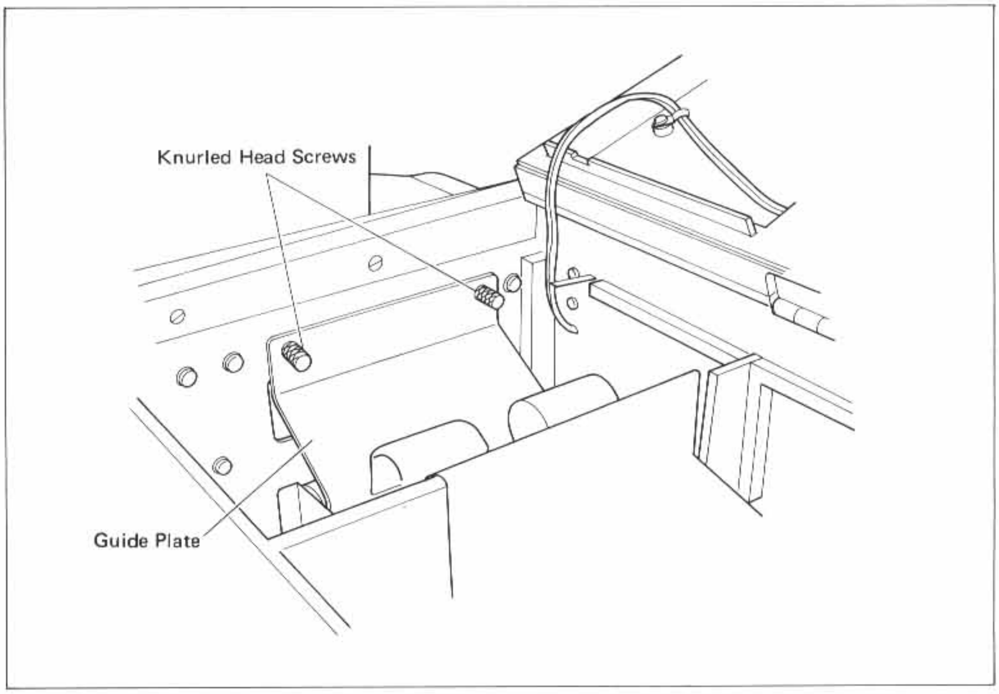
9. Connect the connector to the new replenishment pump.
10. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

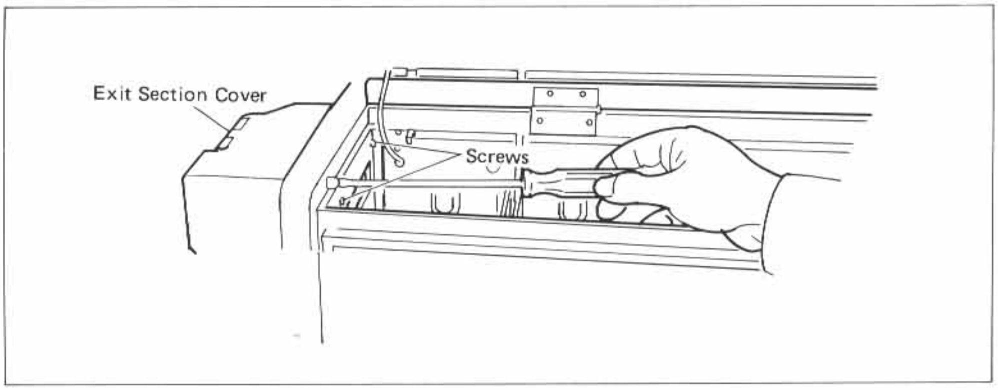
1. Select the pump output volume entry mode by pressing the $\boxed{\text{MODE}}$ $\boxed{5}$ $\boxed{\text{SUB}}$ and $\boxed{4}$ keys in sequence.
2. Operate the newly installed pump to check for proper solution delivery.
3. Ensure that no solution leaks occur around the replenishment pump.
4. After checkout completion, enter the pump output volume.

5.4 Drive Chain Replacement

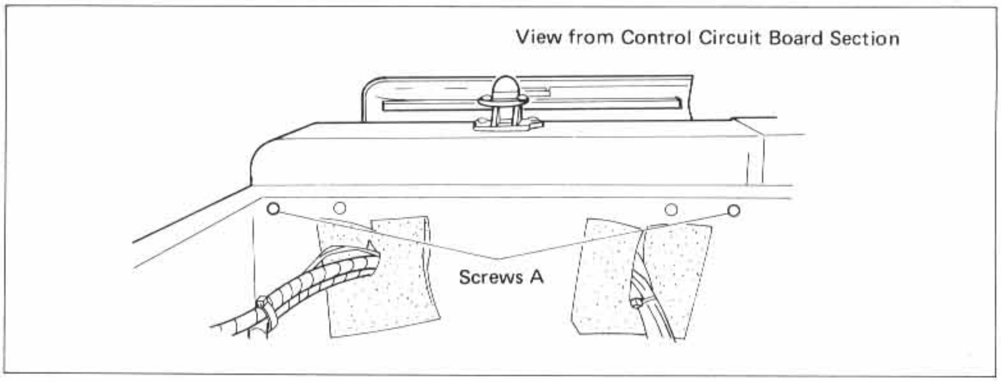
1. Remove all crossover and processing racks from the processing tanks.
   CAUTION: Use care to prevent inter-solution contamination.
2. Remove the dryer guide plate and rack.

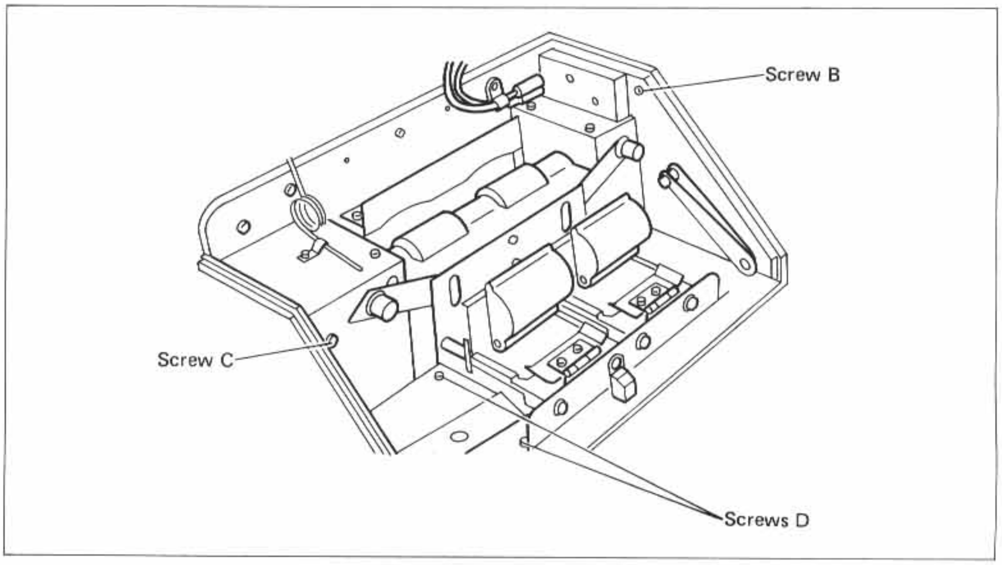


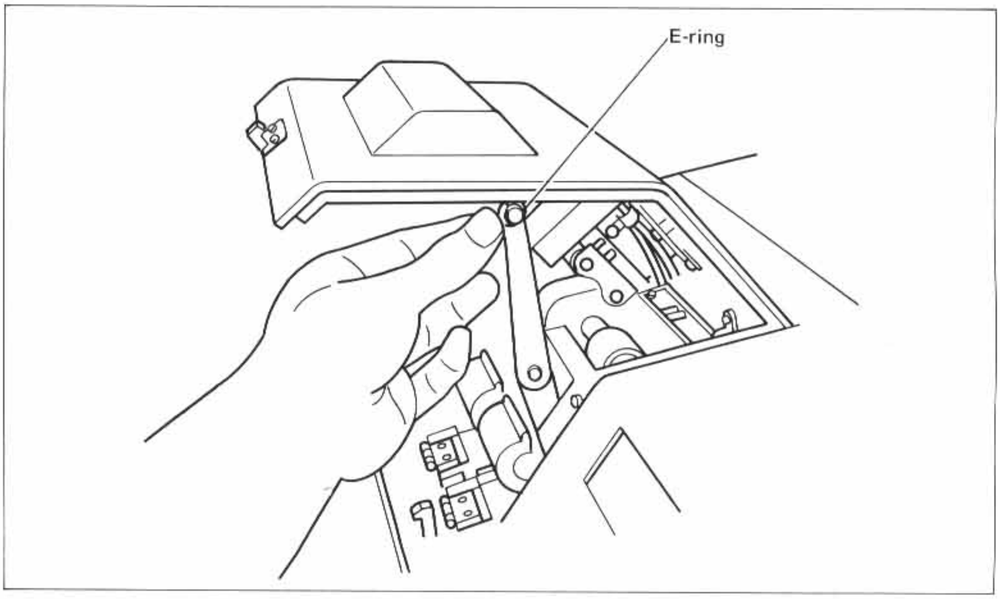
3. After removing the two single slot screws pull the output section cover up and out.



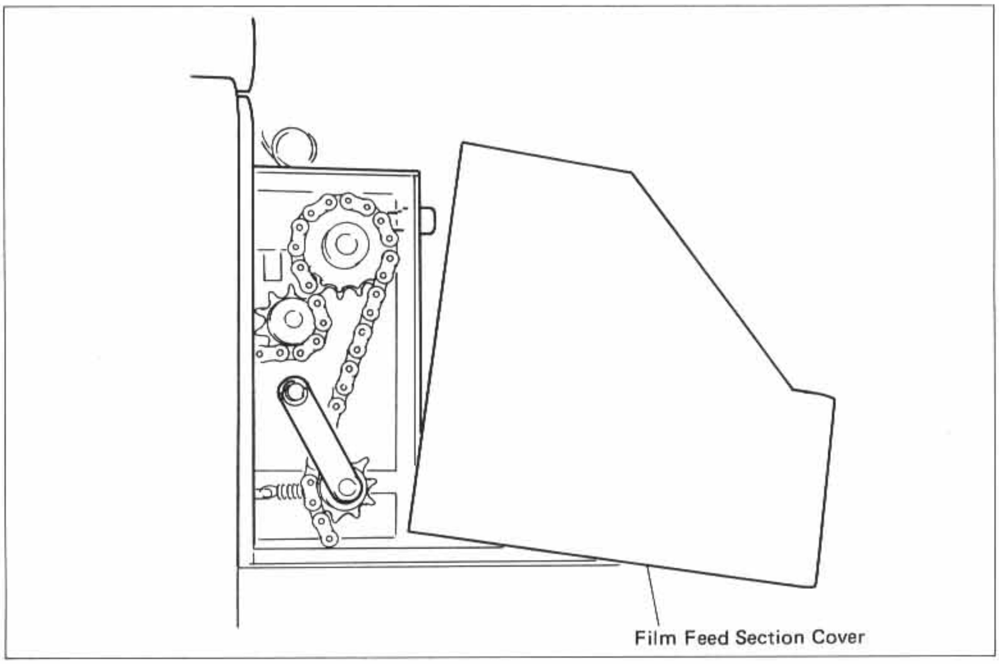
4. Remove the side cover from the replenishment pump section.
5. Remove film feed section cover retaining screws A through D and the cover open-close arm retaining E-ring.





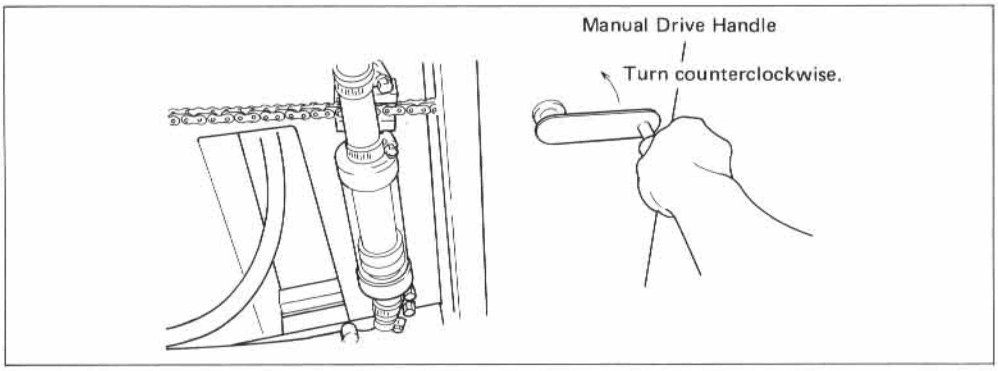


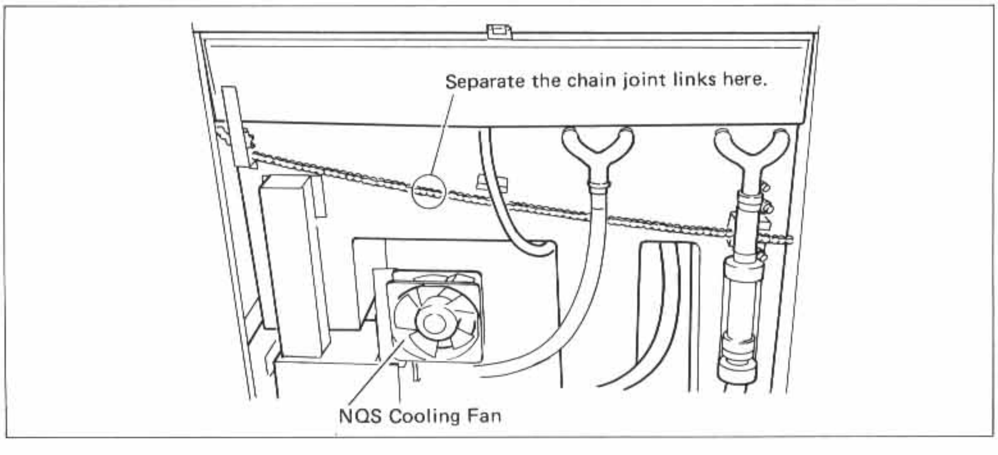
6. Remove the film feed section cover.



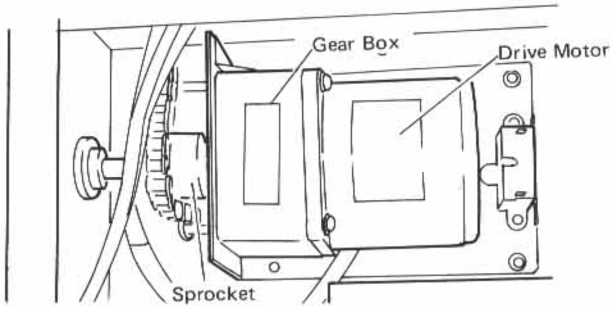
NOTE: The cover is removable after the automatic lock connector is disconnected.

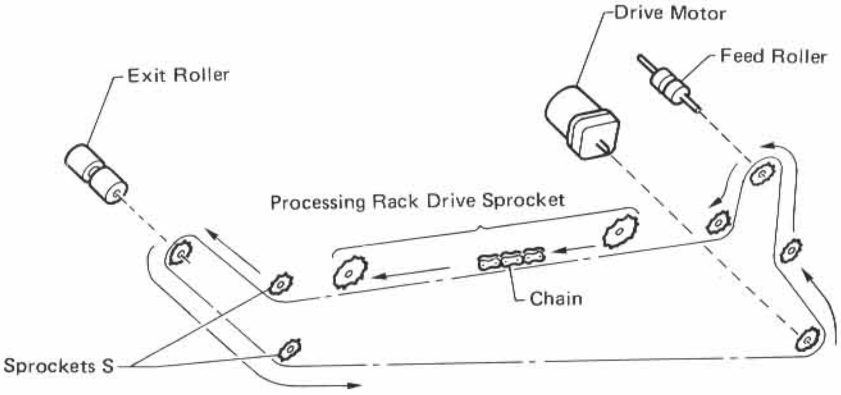
7. Insert the manual drive handle into its socket and turn it counterclockwise until the chain joint section comes to a position above the NQS cooling fan.





8. Separate the chain joint links, then turn the manual drive handle until the chain comes off.
9. Place a new chain on the drive motor sprocket, and then while turning the manual drive handle, thread the chain through the film feed sprocket, processing tank, and dryer exit sprocket sections in the order named.





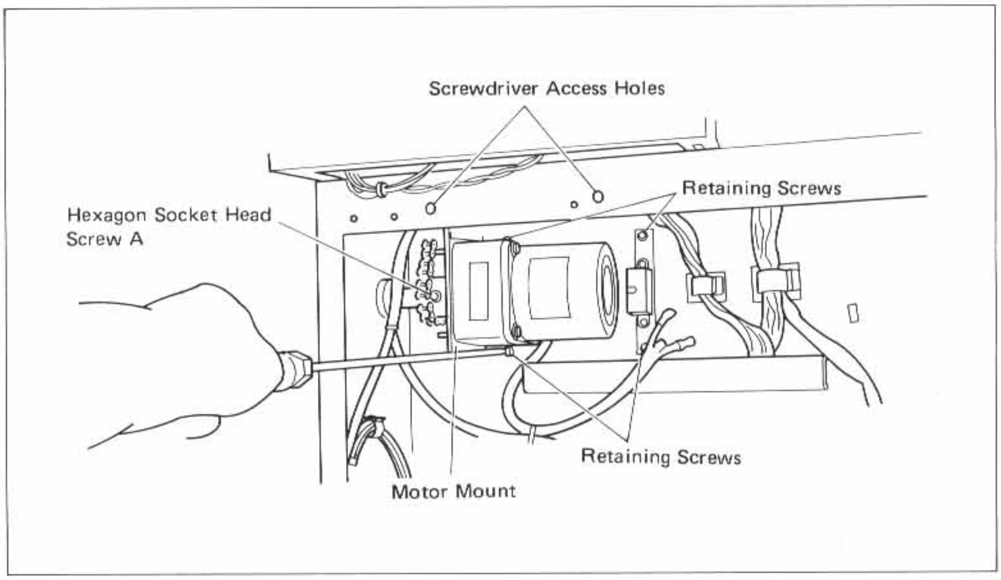
10. Thread the remaining portion of the chain along the sides of the NQ1 to NQ3 processing tanks.
11. Reassemble the chain. Sprockets S may be removed beforehand for ease of reassembly.
12. Complete reinstallation in an order that is the reverse of removal.
13. Apply lubricant to the chain.

< Post-replacement Checkout >

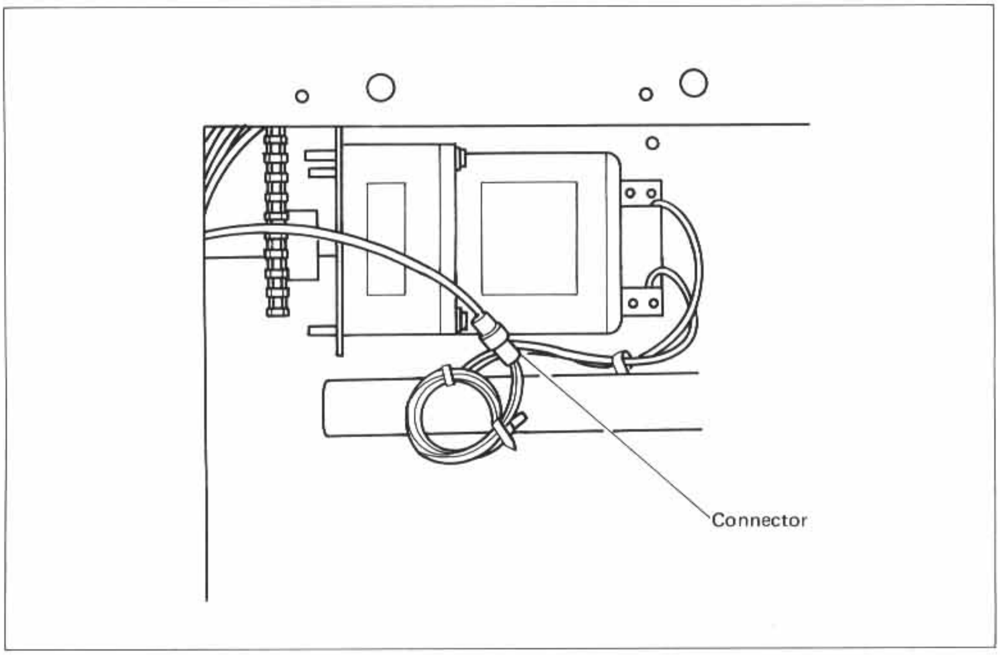
1. Select the drive motor test mode by pressing the MODE 6 SUB and 2 keys in sequence.
2. Press the START switch to verify that the newly installed chain runs smoothly.

5.5 Drive Motor (Gear Box) Replacement (Line Frequency Change)

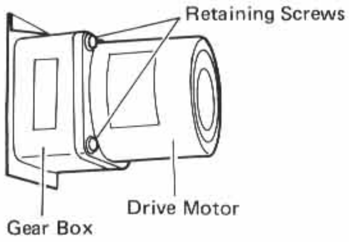
1. Remove the control circuit board section cover.



2. Disconnect the drive motor connector.



3. Remove the four drive motor mount retaining screws and take the motor unit off the sprocket.
4. Remove the two hexagon socket head screws A that secure the drive motor sprocket to the gear box shaft.
5. Remove the four screws that secure the drive motor and gear box, then replace the drive motor (or gear box).



Note that the gear box type varies with the line frequency.

		* Part Numbers (Sprocket Coupled)
50 Hz	Oriental 4GA300K	395G03101
60 Hz	Oriental 4GA360K	395G03102

6. Complete reinstallation in an order that is the reverse of removal.

NOTE: When installing the motor unit and sprocket, align the gear box shaft flat machined surface counterbore with the sprocket screw hole, and then install and securely tighten the hexagon socket head screw to which screw locking bond is then to be applied.

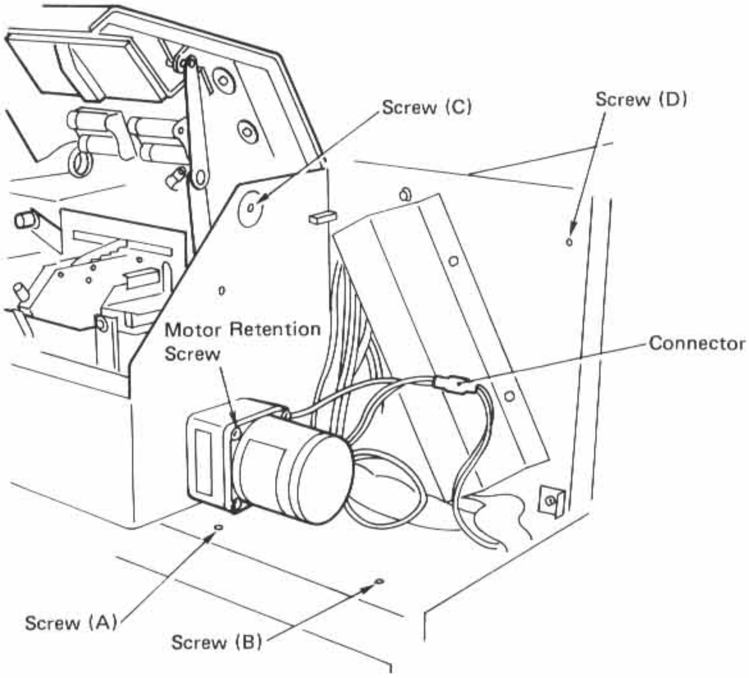
< Post-replacement Checkout >

1. Select the drive motor test mode by pressing the $\boxed{\text{MODE}}$ $\boxed{6}$ $\boxed{\text{SUB}}$ and $\boxed{2}$ keys in sequence.
2. Press the START switch to verify that the drive system operates properly.

5.6 Automatic Loading Drive Motor and Gear Head Replacement

NOTE: There is to be no power supply line frequency related gear head replacement as the present configuration can be used for both 50 and 60 Hz.

1. Remove the control circuit board section cover.
2. Take out the four screws designated (A), (B), (C), and (D) in order to remove the control panel cover. Screw (D) is a normal screw (minus) located near the replenisher tank.



3. Remove the four motor retention bolts.
4. Remove the condenser.
5. Disconnect the connector and remove the motor.

< Gear Head Replacement >

6. Remove the gear head with the cam attached.
7. Reposition and tighten the old cam on the new gear head.
8. Replace all parts in reverse order of removal.

   NOTE: When reinserting the gear head take care that the internal microswitch does not bump up against the cam.

< Post Replacement Checks >

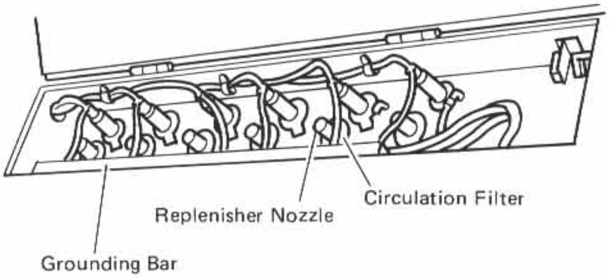
With the $\boxed{\text{MODE}}$ $\boxed{0}$ $\boxed{\text{SUB}}$ $\boxed{9}$ $\boxed{2}$ $\boxed{\text{YES}}$ keys activated in sequence, manually turn ON the cassette and light lock cover detection microswitches so as to check on automatic loader drive motor functions and ensure that the leader throughput shaft stops (pulled out condition) at the lowest section.

NOTE: In reference to the leader throughput shaft see paragraph 4 in section 5.9.2.

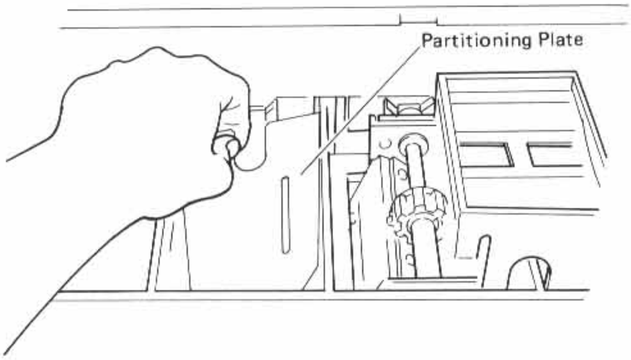
5.7 Solution Level Detection Float Switch Replacement

1. Drain the processing tank on which the bad float switch is mounted.
2. Remove the processing rack.

   CAUTION: Use care to avoid solution spillover from one tank to another.
3. Remove the subtank section cover, then take out the circulation filter and replenisher nozzle (located at the left of the circulation filter).



4. Remove the partitioning plate between the processing tank and subtank.



5. Disconnect the float switch connector.

   NOTE: The grounding bar may be removed to faciliate connector removal.
6. Cut the connector line to the float switch. Remove the float switch lock nut and take out the float switch from the subtank.
7. Insert a new float switch from inside the subtank and dress the connector pin attached wire through the mounting hole.
8. Mount the new float switch on the subtank and connect the supplied connector to the float switch connector pins.
9. Complete reinstallation in an order that is the reverse of removal.

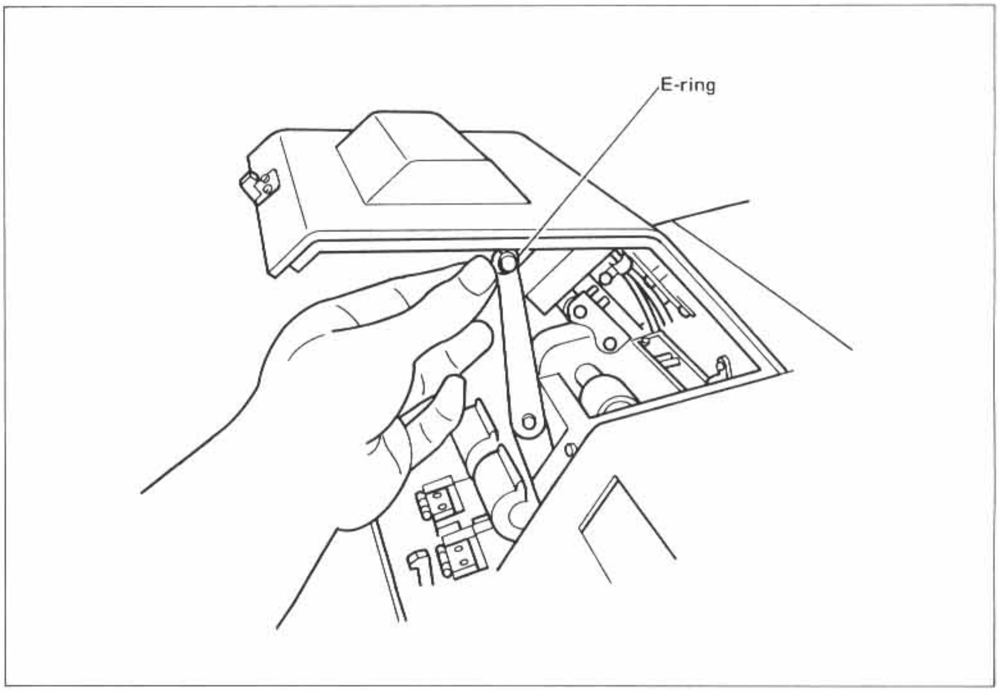
< Post-replacement Checkout >

1. Pour water into the processing tank until it overflows.

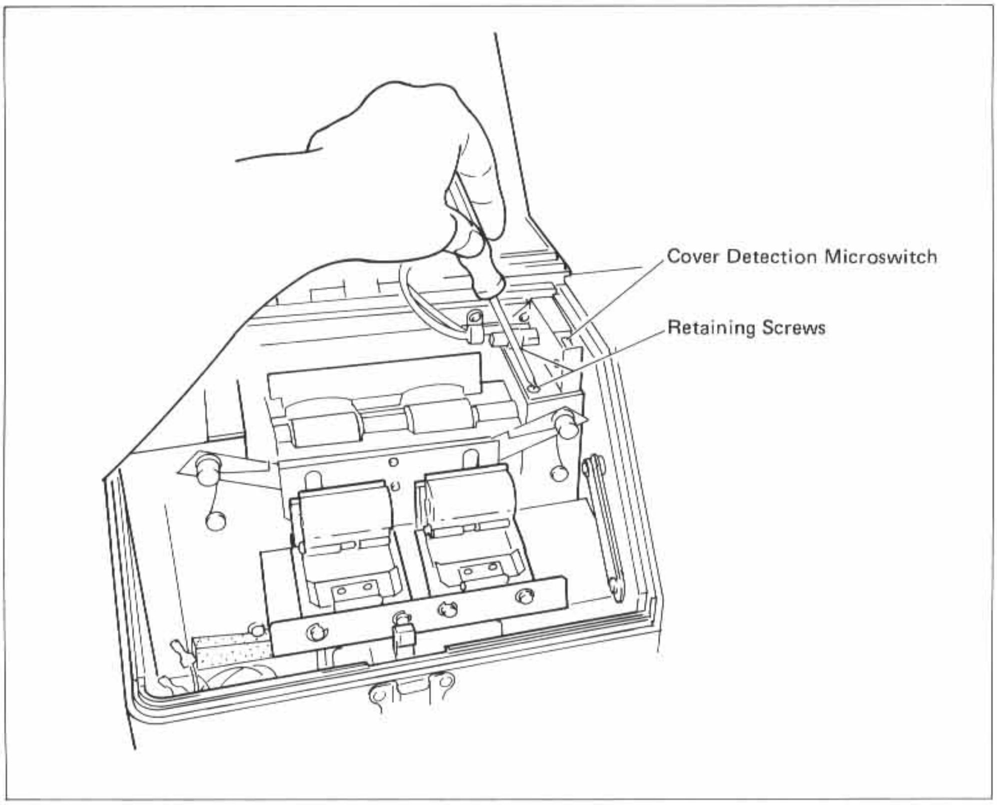
   NOTE: Pour water only into the processing tank for which float switch replacement is being undertaken.
2. Turn on the POWER switch to ensure that error E70 (SOLUTION LEVEL TOO LOW) does not occur.
3. Gradually drain the water to ensure that error E70 occurs the moment the float switch goes off.
4. After completion of checkout, completely drain the water, charge the processing tank with solution, and resume processing operations.

5.8 Film Feed Section Cover Detection Microswitch (S5) Replacement

1. Take out the film feed section cover open-close arm after removing the retaining E-ring.



2. Remove the two retaining screws from the cover detection microswitch (S5) mounting cover.



3. Disconnect the fastening terminal. Remove the microswitch mounting cover and fastening terminal as an assembly.
4. Replace the microswitch and properly reconnect its fastening terminal.

   NOTE: This microswitch is normally open (NO). Its fastening terminal wire colors and destinations are as indicated below.

   COM terminal — Red* fastening terminal wire
   * The color has been changed to green from serial numbers 2551 and above.
   NO terminal — Brown fastening terminal wire
5. Complete reinstallation in an order that is the reverse of removal.

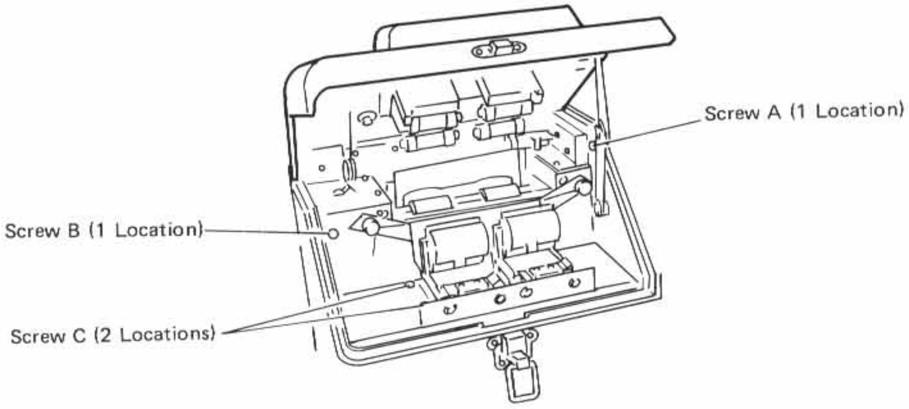
< Post-replacement Checkout >

1. Select the I/O check mode by pressing the [MODE] [6] [SUB] and [4] keys in sequence, and then enter INPUT mode port number 16.
2. Repeatedly turn the microswitch ON and OFF manually to verify that the 7th bit alternates between the 1 and 0 states.

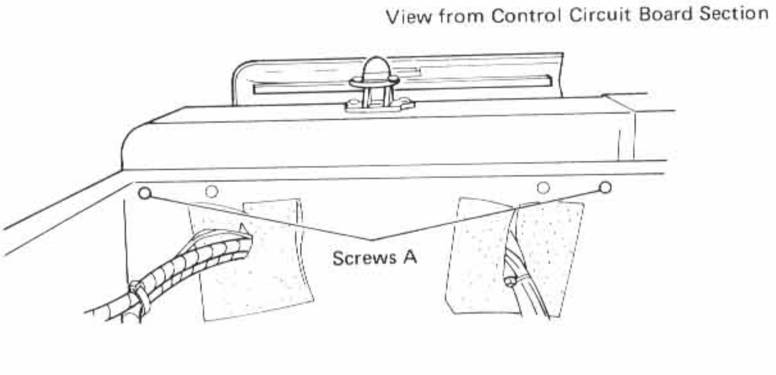
5.9 Film Trailing End Pressure Detection Microswitch (S9/S10) Replacement

5.9.1 FP350 Film Trailing End Pressure Detection Microswitch (S9/S10) Replacement

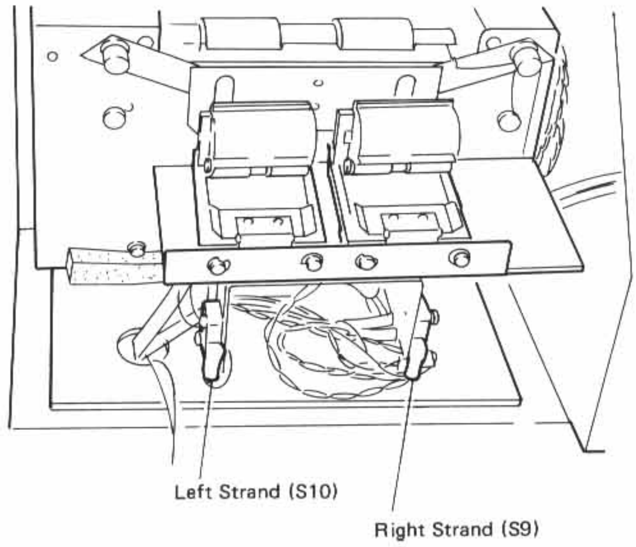
1. Remove screws A through C. Screws C should be removed with the plate attached.



2. Take off the control circuit board section cover and remove the film feed section cover retaining screws.



3. Slide the feed section cover forward, disconnect the automatic lock connector, and remove the cover.
4. Remove the bad film trailing end pressure detection microswitch (S9 or S10) after removing its two retaining screws. Note that one film trailing end pressure detection microswitch is provided for each strand.



Film Trailing End Pressure Detection Microswitch

5. Disconnect the fastening terminal, then replace the microswitch with a new one.

   NOTE: This microswitch is normally closed (NC). Its fastening terminal wire colors and destinations are as indicated below.

Right Strand	COM terminal – White fastening terminal wire NC terminal – Black fastening terminal wire
Left Strand	COM terminal – Brown* fastening terminal wire * The color has been changed to red from serial numbers 2551 and above. NC terminal – Red fastening terminal wire

6. Install the new microswitch in its place. Ensure that the following requirements are met.
   1 Microswitch actuator must be in contact with the film magazine support.
   2 The microswitch must be adjusted so that it turns ON when the film magazine support moves about 6 mm.
7. Complete reinstallation in an order that is the reverse of removal.

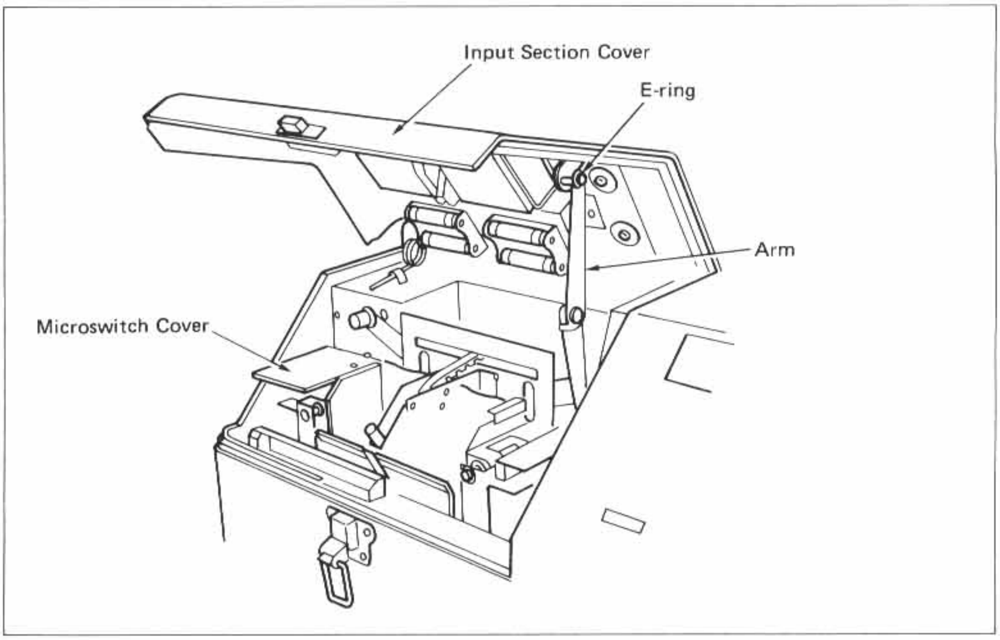
< Post-replacement Checkout >

1. Select the I/O check mode by pressing the MODE 6 SUB and 4 keys in sequence, and then enter INPUT mode port number 26.
2. Turn the microswitch ON and OFF by sliding the magazine support to verify that bit 0 (right strand) or 1 (left strand) alternates between the 1 and 0 states.

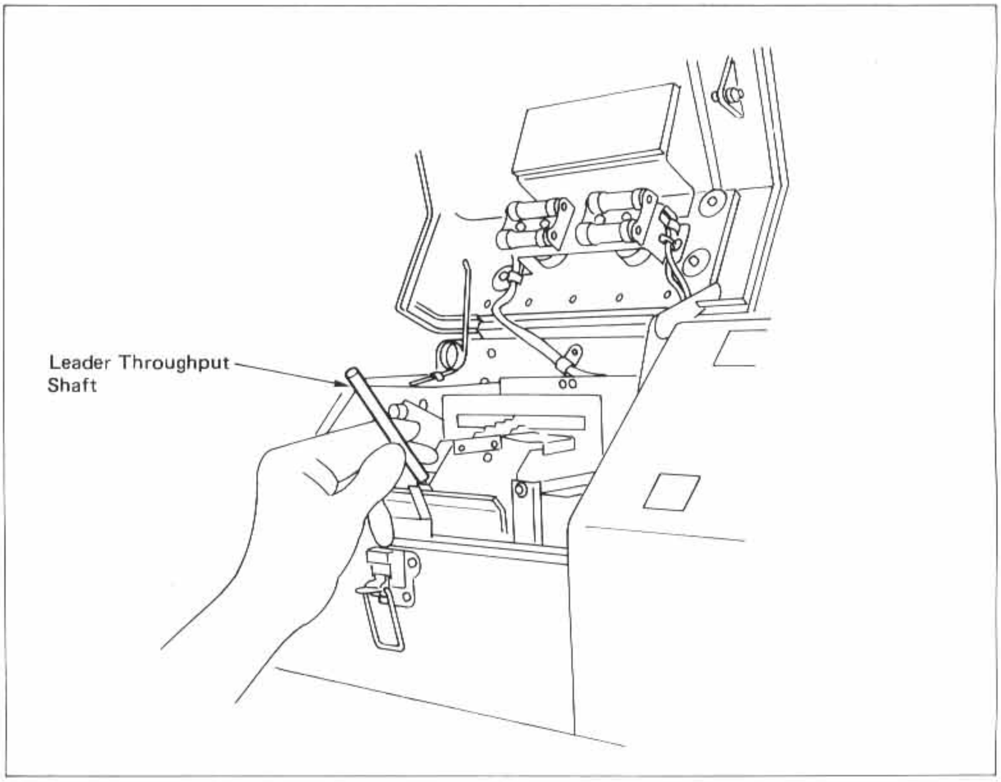
   NOTE: In normal processing operations, ensure that the film trailing end solenoid (SOL1 or SOL2) actuates when the film trailing end pressure detection microswitch (S9 or S10) goes ON.

5.9.2 Automatic Loader Film Trailing End Pressure Detection Microswitch (S9/S10) Replacement

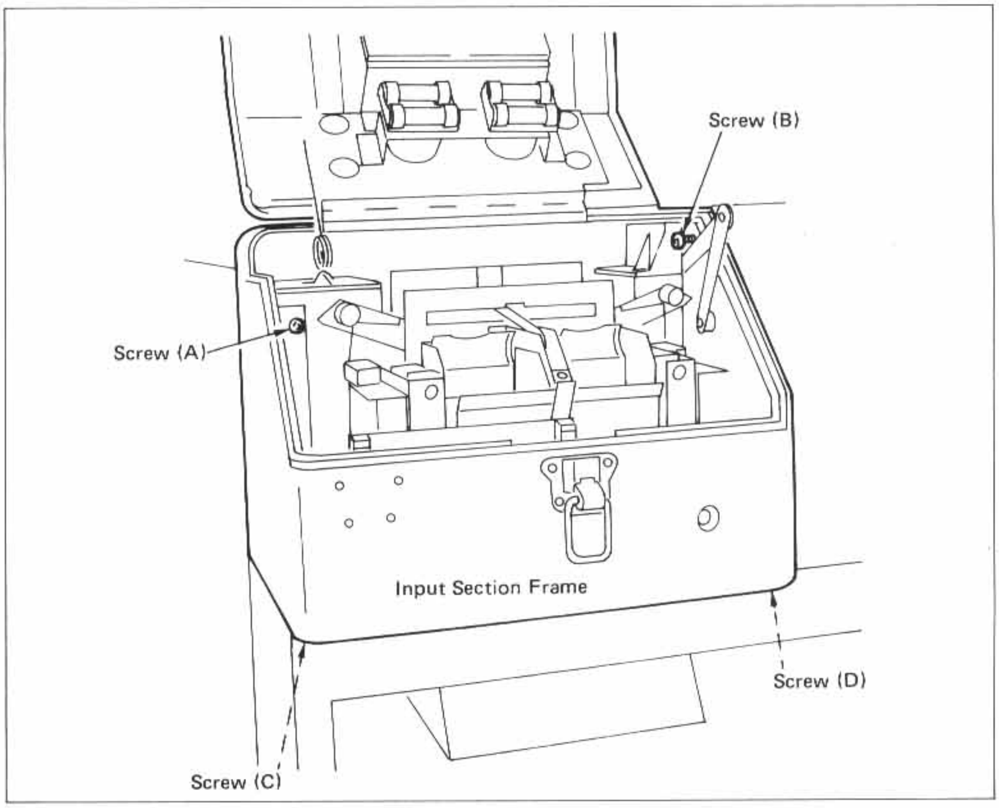
1. Remove the control section and control panel covers. (See 1.2 under section 5.6.)
2. Remove the E-ring retaining the input section opening and closing arm, and remove the arm.
3. Remove the microswitch cover (black plastic retained by one screw).



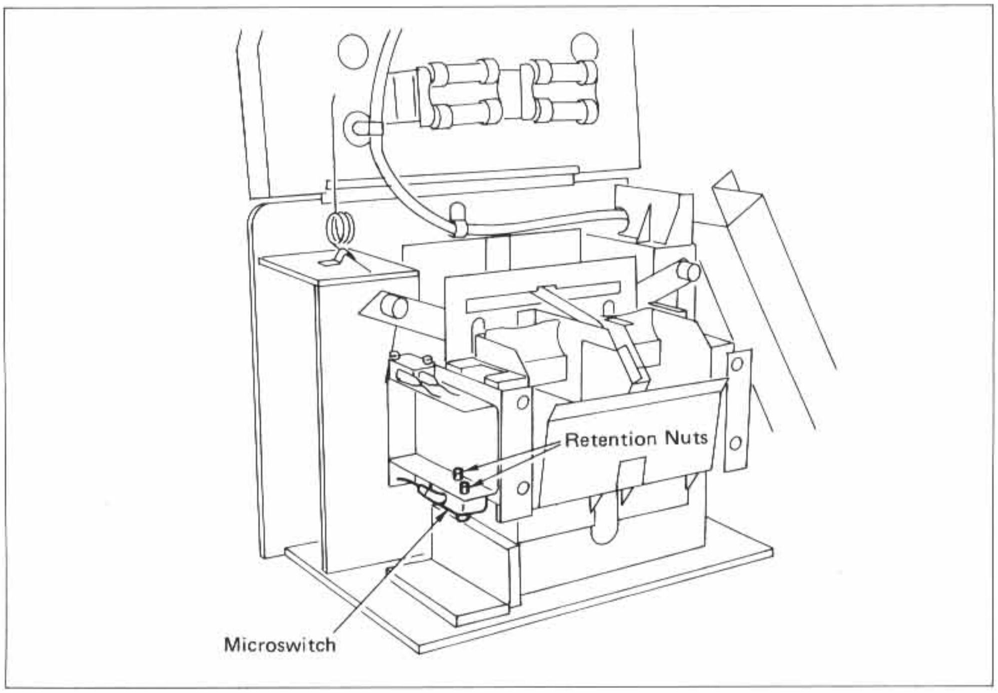
4. Pull out the automatic loader incorporated leader throughput shaft.



5. Remove the input section frame.
   Remove the four screws (A), (B), (C), and (D). (Screws (C) and (D) are located on the lower left- and right-hand outer peripheries of the control section.)



6. Remove the microswitch fastening terminals.
7. Remove the microswitch retention nuts and replace the microswitches.



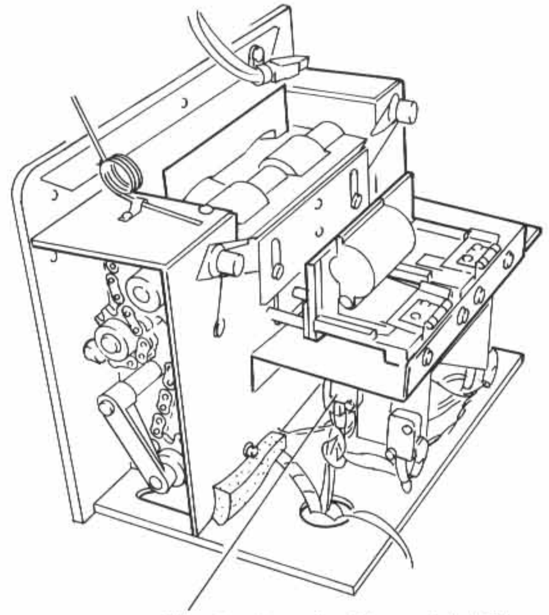
< Post Replacement Checks >

Follow the procedures outlined in section 5.9.1.

5.10 Film Cut Detection Microswitch (S6/S7) Replacement

5.10.1 FP350 Film Cut Detection Microswitch (S6/S7) Replacement

1. Perform steps 1 through 3 in section 5.9.1.
2. Unscrew and remove the bad film cut detection microswitch. Note that there are two film cut detection microswitches (S6 and S7) behind the film trailing end pressure detection microswitches. One is for the right strand and the other for the left strand.



3. Disconnect the fastening terminal and then replace the microswitch.

   NOTE: This microswitch is normally open (NO). Its fastening terminal wire colors and destinations are as indicated below.

Right Strand	COM terminal – Yellow fastening terminal wire NO terminal – Orange fastening terminal wire
Left Strand	COM terminal – Blue fastening terminal wire NO terminal – Green fastening terminal wire

4. Install the new microswitch. Ensure that the following requirements are satisfied.
   - The microswitch must be adjusted so that it turns ON when the magazine support moves about 18 mm.
5. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

1. Select the I/O check mode by pressing the MODE 6 SUB and 4 keys in sequence, and then enter INPUT mode port number 17.
2. Turn the microswitch ON and OFF by sliding the magazine support to ensure that bit 2 (right strand) or 3 (left strand) alternates between the 1 and 0 states.

5.10.2 Automatic Loading Film Cut Detection Microswitch (S6/S7) Replacement

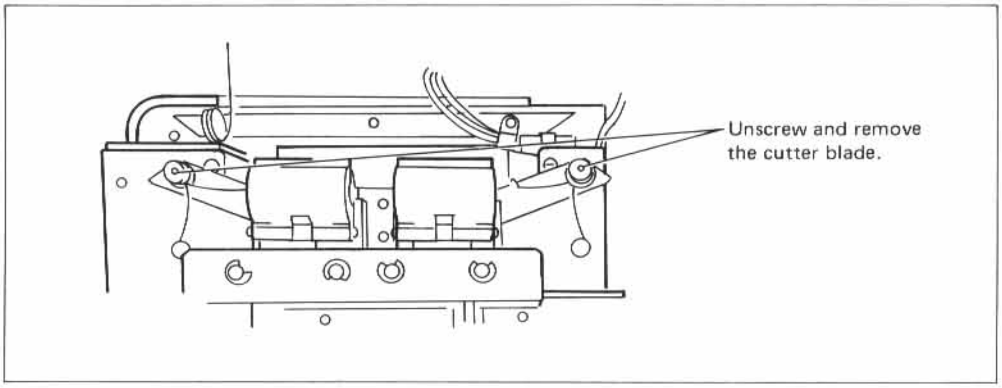
1. Remove the E-ring retaining the input section cover opening and closing arm, and remove the arm.
2. Remove the microswitch cover (black plastic retained with one screw).
3. Remove the fastener terminal strip and replace the microswitches.

< Post Replacement Checks >
Follow the procedures outlined in section 5.10.1.

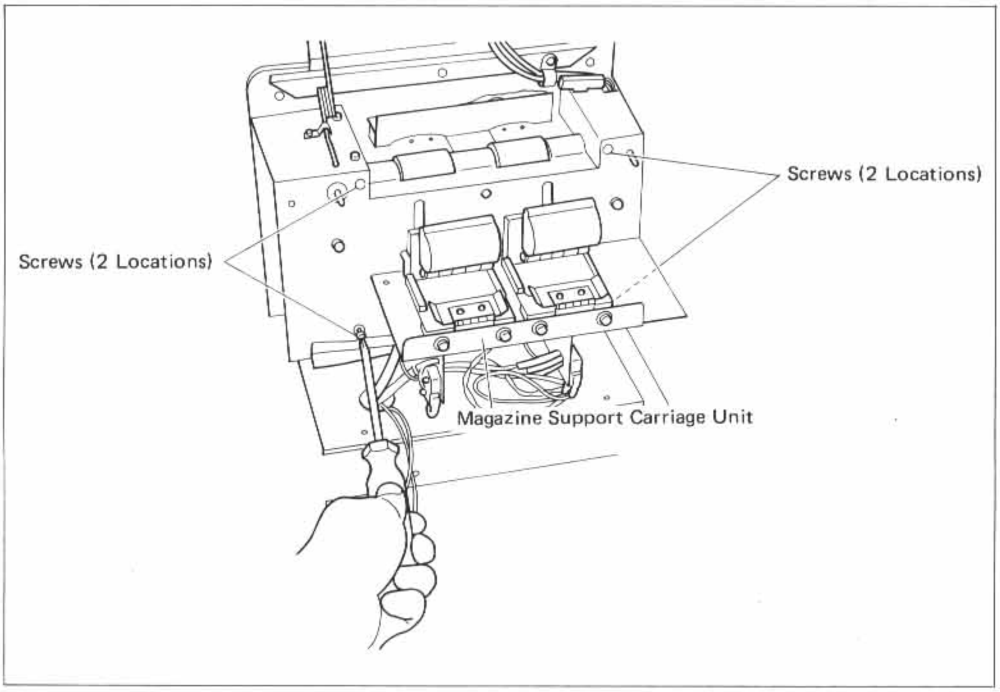
5.11 Cutter Solenoid (SOL1/SOL2) Replacement

5.11.1 FP350 Cutter Solenoid (SOL1/SOL2) Replacement

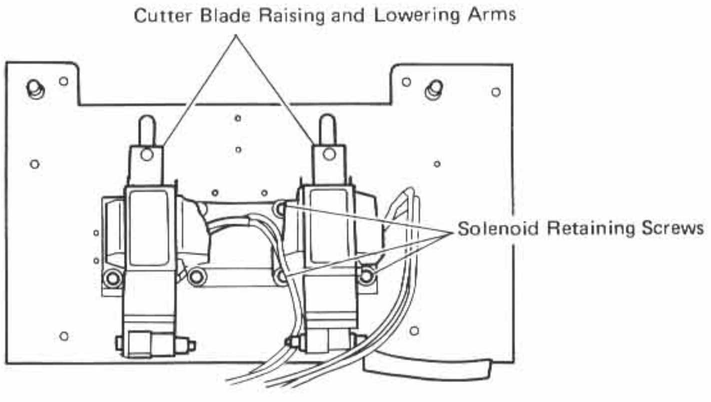
1. Perform section 5.9.1 steps 1 through 3.
2. Remove both the right- and left-strand cutter blades.



3. Take out the magazine support carriage unit and its mount after removing the four retaining screws.



4. Take off the bad cutter solenoid after removing its four retaining screws. Note that the cutter solenoids are located on the rear side of the magazine support carriage unit mount.


Cutter Blade Raising and Lowering Arms
Solenoid Retaining Screws

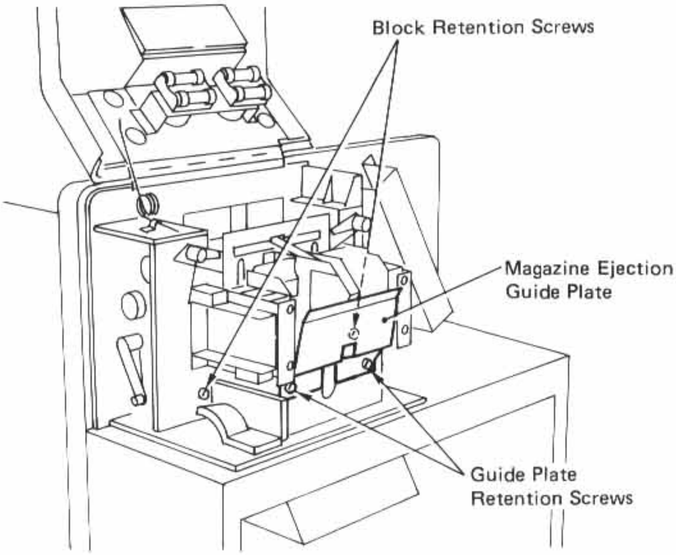
5. Disconnect the connector, then replace the solenoid.
6. Lightly lubricate the cutter blade raising and lowering arms.
7. Complete reinstallation in an order that is the reverse of removal.
   NOTE: When retaining the solenoid always apply screw lock paint.

< Post-replacement Checkout >

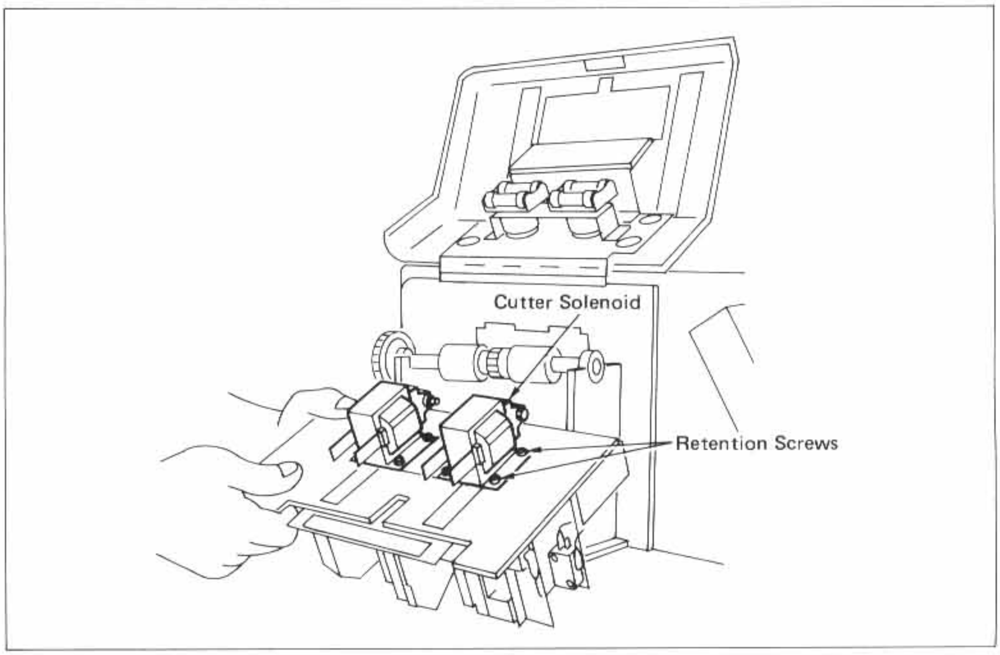
1. Select the cutter test mode by pressing the $\boxed{\text{MODE}}$ $\boxed{6}$ $\boxed{\text{SUB}}$ and $\boxed{1}$ keys in sequence.
2. Ensure that the newly installed solenoid properly operates the cutter blade.

5.11.2 Automatic Loader Cutter Solenoid (SOL1/SOL2) Replacement

1. Complete procedures 1 through 5 in section 5.9.2.
2. Complete procedures 2 through 7 in section 5.15.
3. Remove the film magazine ejection guide plate (two lower section screws).
4. Remove the two film magazine slide section block retention screws and pull the block forward and out.



5. Remove the four solenoid retention screws on the rear of the removed block and replace the solenoid.



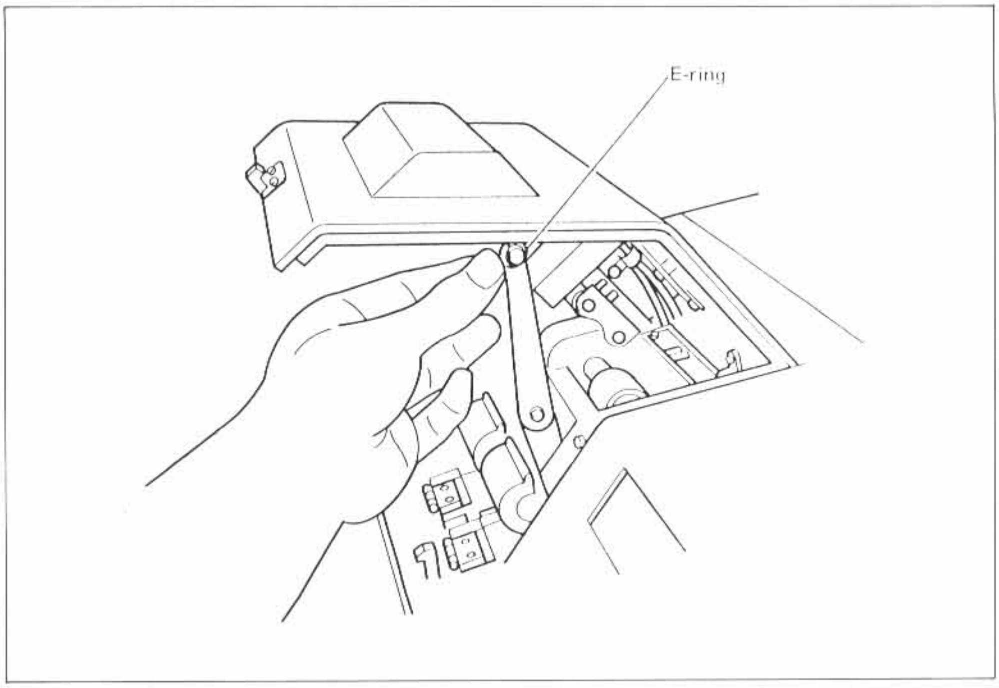
6. Replace all parts in an order that is the reverse of removal.

< Post Replacement Checks >

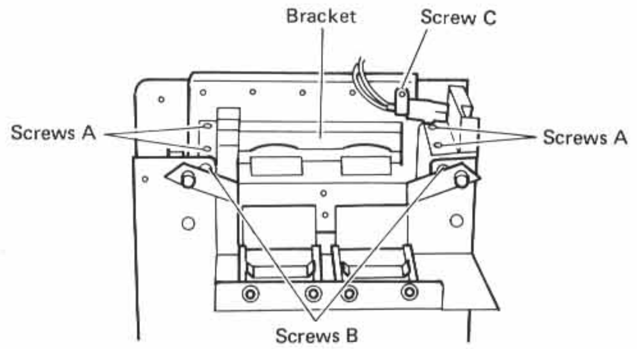
Follow the procedures outlined in section 5.11.1.

5.12 Film/Perforation Sensor Circuit Board Replacement

1. Take out the film feed section cover open-close arm after removing its retaining E-ring.



2. Remove screws A (4 locations).



3. Remove the cutter blade and then screws B (2 locations).
4. Remove screw C.

   NOTE: In the case of the FP350AL, the two screws distanced from the cover section are removed.
5. Lift the bracket, with the sensor circuit board assembly attached, up and out.
6. Remove the sensor circuit board retaining screws and nuts.

   CAUTION: Note that the upper circuit board (light receptor section, 110-054 PT-550F) and lower circuit board (light emitter section, 110-053 GL-514) are retained together. Therefore, when unscrewing the circuit board assembly, be sure to hold the lower circuit board.
7. Replace the bad circuit board.

   The signal line connector should be disconnected from the CPH circuit board and routed upward and out via the cord duct.

   Light receptor circuit board – Connector CN-17
   Light emitter circuit board – Connector CN-16
8. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

1. Using paper or like material, shield the film/perforation sensor section from light.
2. Verify that the following error occurs.

   E44 or E45 (R or L Film Sensor Failure)
   E42 or E43 (R or L Perforation Sensor Failure)
3. Perform film processing to make sure that film size detection is properly made.

5.13 Film Feed Roller Replacement

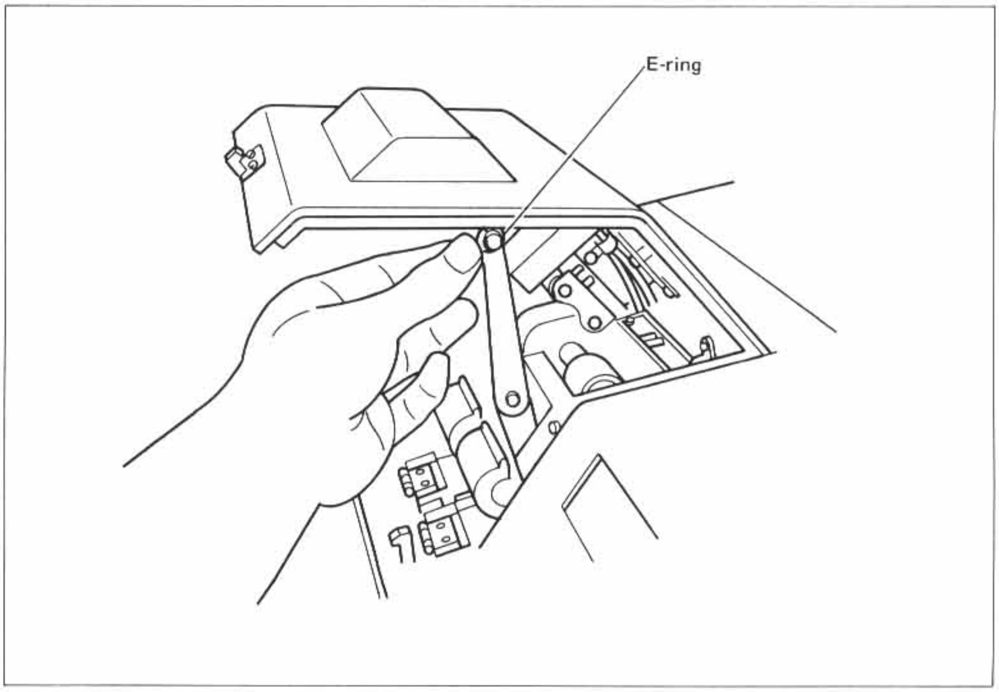
1. Perform section 5.12 steps 1 through 4.
2. Separate the drive chain joint link as directed under Drive Chain Replacement in section 5.4.
3. Remove the chain from the feed roller shaft sprocket.
4. Remove the sensor bracket and remove the shaft from the feed roller.
5. Remove the bearing from one end of the shaft.
6. Apply lubrication to the shaft and ensure that the shaft and roller do not grate.
7. Loosen the feed roller hexagon socket head screw and remove the feed roller from its shaft.
8. Install a new feed roller over the shaft. Align the shaft counterbore with the feed roller hexagon socket head screw, and tighten said screw.
   NOTE: Apply screw locking bond to the screw before it is installed.
9. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

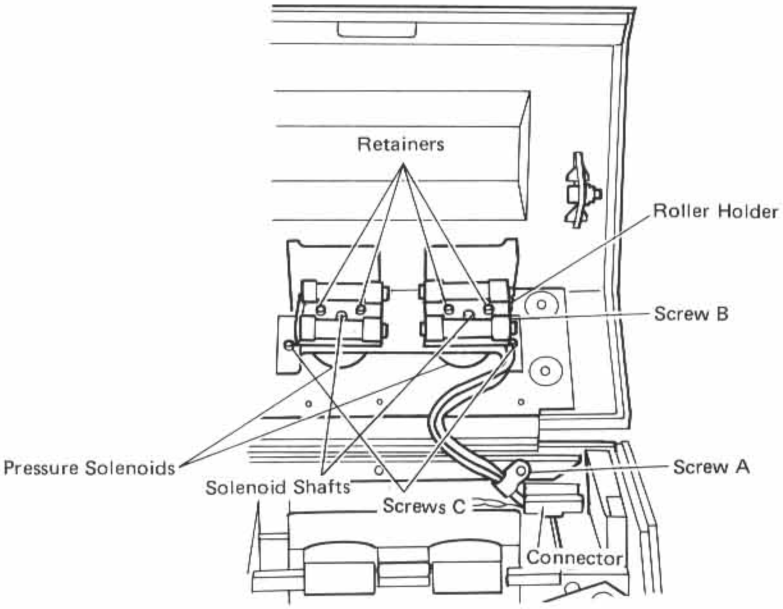
1. Activate the drive system to make sure that the feed roller is not eccentric.
2. Verify that the roller does not come into contact with the bracket.
3. Process a film to check for potential scratches or other film surface problems.

5.14 Film Trailing End Pressure Solenoid (SOL3/SOL4) Replacement

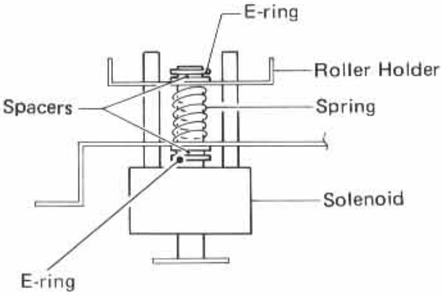
1. Take off the film feed section cover open-close arm after removing its retaining E-ring.



2. Turn the feed section cover down over the processing section cover.
3. Remove solenoid connector clamp retaining screw A and disconnect the connector.



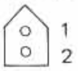
4. Remove cord clamp retaining screw B from one side of the solenoid mounting bracket.
5. Mark the solenoid mounting position. Remove screw C and then the solenoid unit.
   CAUTION: Since screw locking bond has been applied to screw C, use care not to damage the screw threads.
6. Remove the E-ring which retains the two pressure rollers. Pull out the shaft and remove the pressure rollers.
   NOTE: Do not lose the spacers located between the pressure rollers and roller holders.
7. Remove the two retainers using a regular screwdriver.
   NOTE: Screw locking bond has been applied to the retainers.
8. Remove the solenoid shaft retaining E-ring and take out the solenoid.
   NOTE: Keep track of the spring and spacer.
9. Install a new solenoid on the mounting bracket. Do not fail to install the spring and spacer which were removed in step 8.



10. Complete reinstallation in an order that is the reverse of removal.

NOTE 1: Be sure to apply screw locking bond to the parts to which said bond was originally applied.

NOTE 2: Since the solenoid is of the DC type, be careful that proper polarity is observed.



The connector toward the 1P is positive.

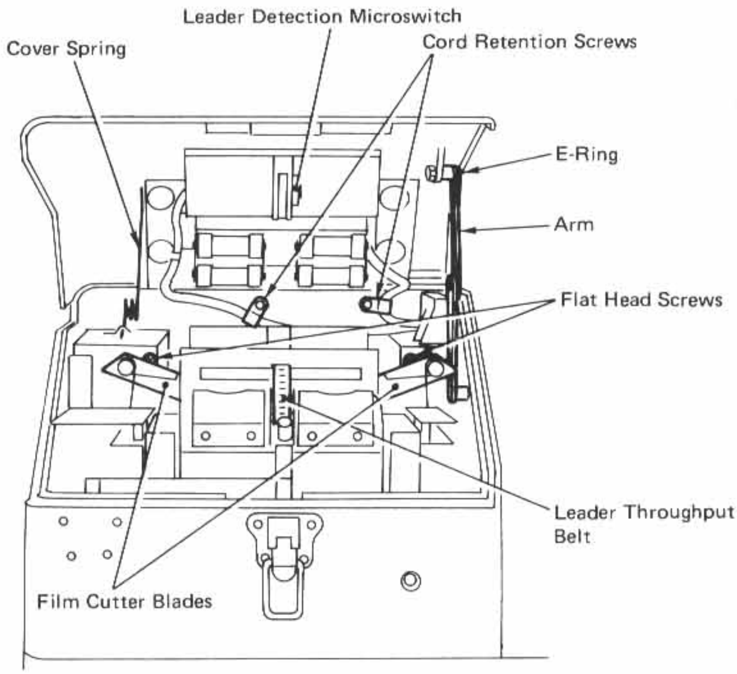
< Post-replacement Checkout >

1. Select the I/O check mode by pressing the MODE 6 SUB and 4 keys in sequence, and then enter OUTPUT mode port number 26.
2. Enter 1 to bit 4 (right strand) or 5 (left strand) to ensure that the solenoid turns ON.

   NOTE: Do not allow the solenoid to remain on for longer than ten seconds. If the solenoid remains ON longer than for this period, it may burn out.
3. Process a test film to check for feed roller induced desensitizing or other problems.

5.15 Automatic Loading Leader Throughput Belt Replacement

1. Remove the E-ring retaining the input section opening and closing arm, and remove the arm.
2. Remove the two screws retaining the cord coming from the cover section.
3. Remove the cover spring.

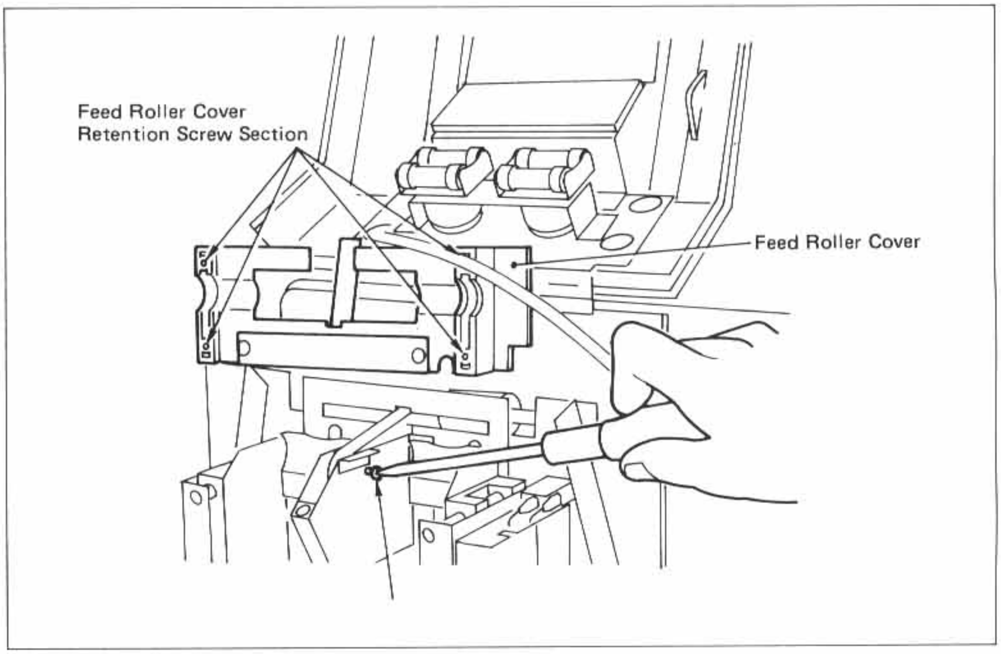


4. Remove the film cutter blade.

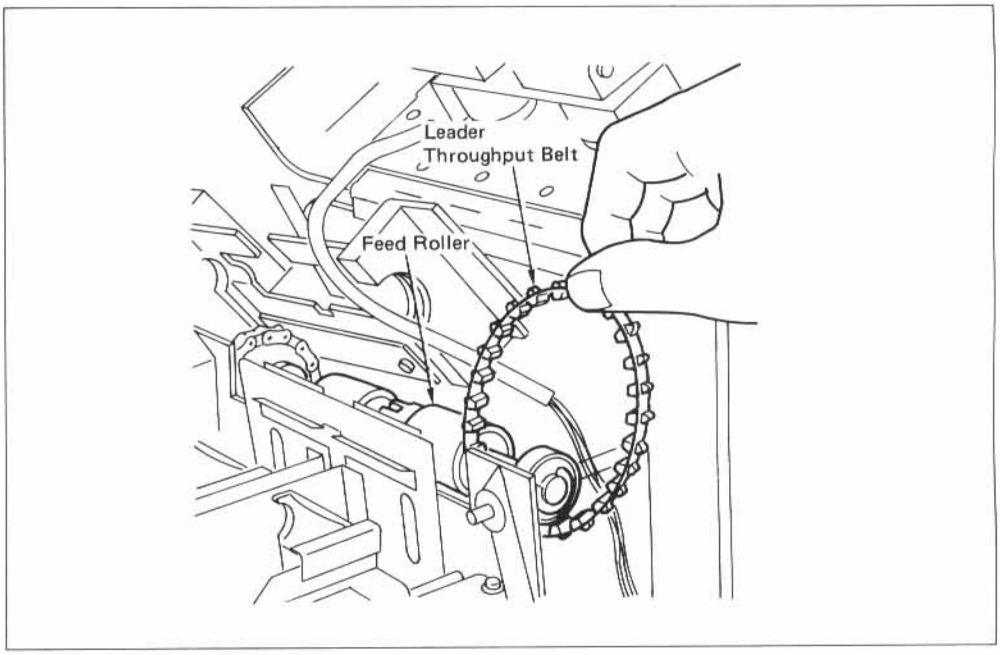
   NOTE: When replacing these parts, be sure to use the same part positioning orientations with the blade, washer, and spring as well as the retention screw properly positioned in relation to each other.

5. Remove the two flat head screws located below the cutter blade.
6. Remove the four feed roller cover retention screws and remove the roller cover.
7. Remove the two screws retaining the belt guide roller and remove the guide roller.

NOTE: Do not drop the guide roller or the guide roller incorporated shaft retainer.



8. Remove the belt from the feed roller.
9. Parts replacement is the reverse of removal.



5.16 Automatic Loading Leader Throughput Motor Cam Detection Microswitch (S12) Replacement

1. Carry out procedures 1 through 5 in section 5.9.2.
2. Replace the microswitch inside the input section frame.

5.17 Automatic Loading Leader Throughput Motor Cam Replacement

1. Carry out procedures 1 through 5 in section 5.9.2.
2. Loosen the input section frame contained motor cam set screw and pull off the cam.
3. When replacing the cam tighten the set screw so that it impinges on the motor shaft flat facing surface.

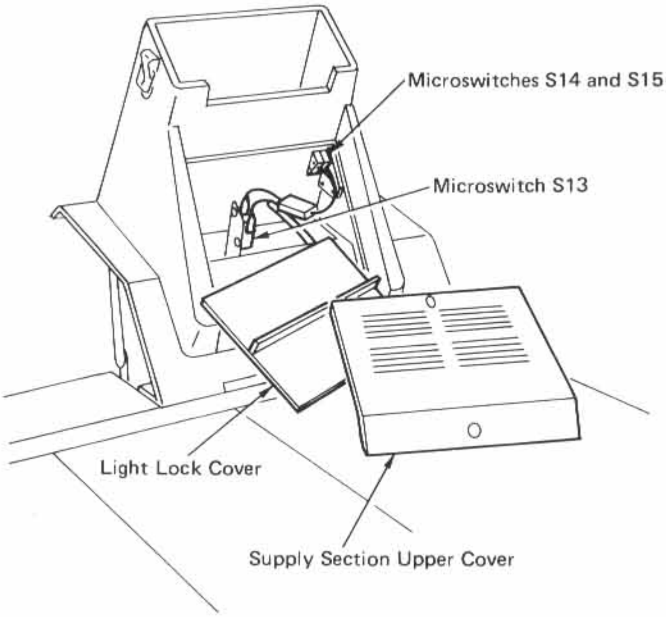
< Post Replacement Checks >

1. Through MODE 6 SUB and 4 keys activation for the "I/O Check", designate input mode number 64.
2. Ensure that when the automatic loading leader throughput shaft is in its uppermost position bit 0 is 1, and when in the lowest position bit 0 is 0.

   CAUTION: The throughput shaft up and down functioning is made possible through the "I/O Check" OUT MODE number 64 bit 0 1=ON by pressing the YES key. Further, while the YES key is being pressed the shaft moves continously up and down but when the YES key is released the movement stops in transit requiring that after the checkout has been completed the throughput shaft must be brought again to its lowest position.

5.18 Automatic Loader Cassette/Light Lock Cover Detection Microswitch (S14/S15) Replacement

1. Remove the upper cover from the supply section.
2. Remove the light lock plate.
3. Remove the microswitch bracket.
4. Remove the connector and replace the microswitches.

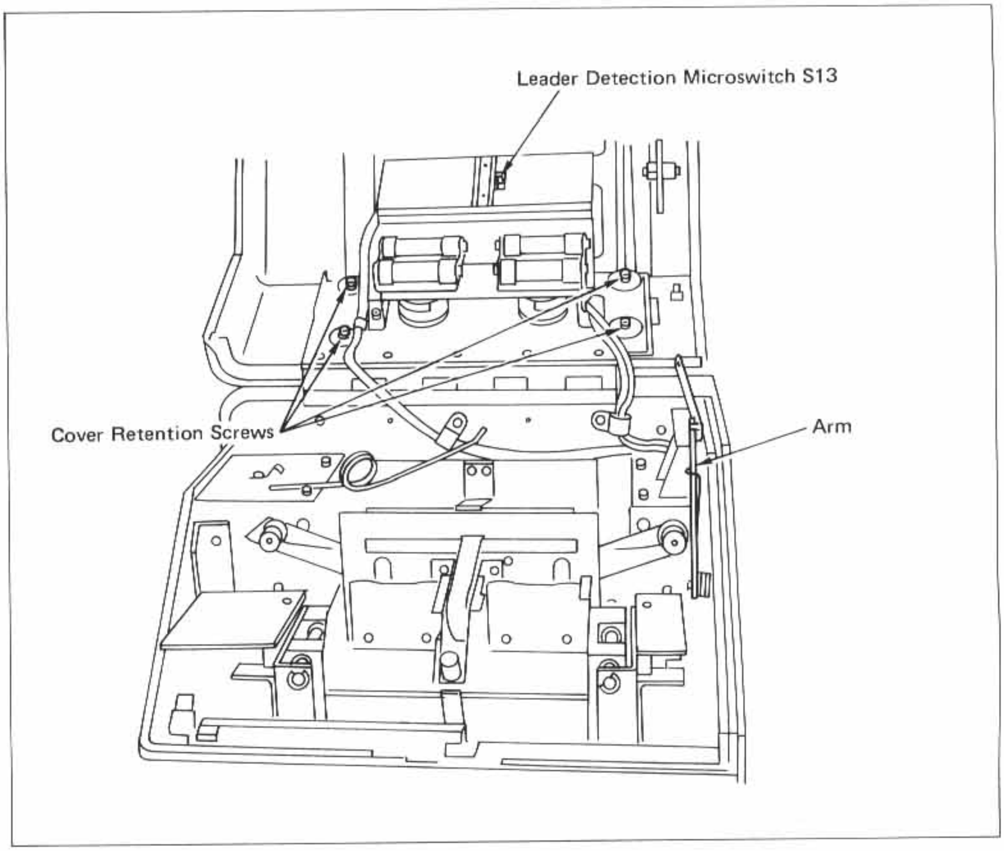


<Post Replacement Checks>

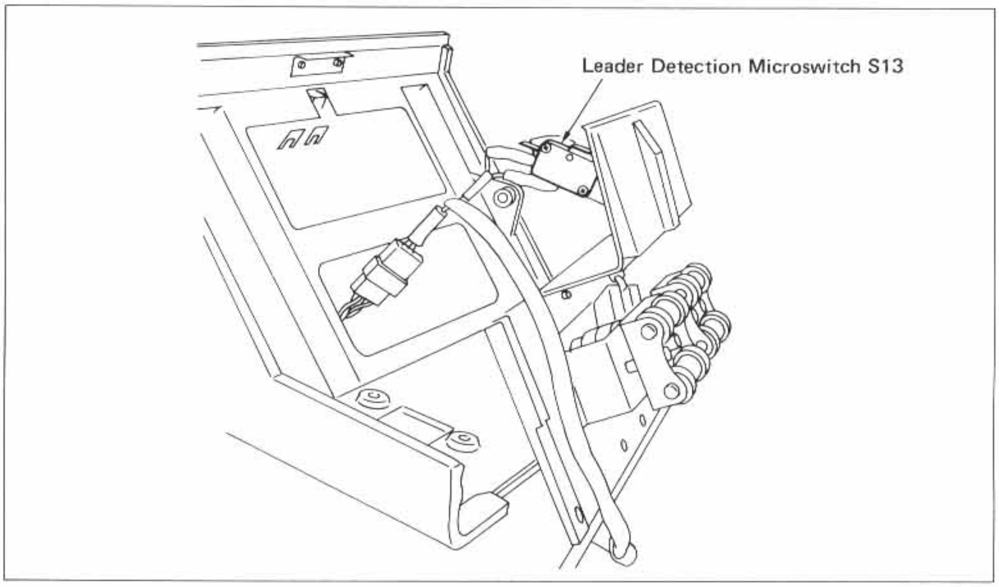
1. Through MODE 6 SUB and 4 keys activation for the "I/O Check", designate input mode number 64.
2. Ensure that when the microswitch is being turned ON and OFF manually the second (cassette detection) and third (light lock cover detection) bits change alternately between 1 and 0.

5.19 Automatic Loading Leader Detection Microswitch (S13) Replacement

1. Remove the input section cover opening and closing arm E-ring and remove the arm.
2. Remove the four screws retaining the input section cover and remove the cover.



3. Remove the fastening terminal and replace the microswitch.



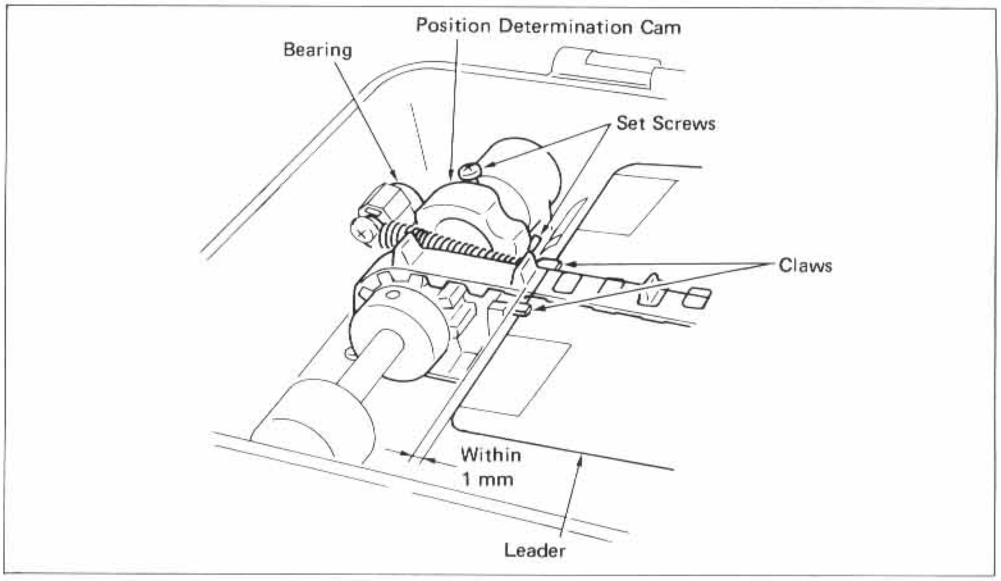
< Post Replacement Checks >

1. Through MODE 6 SUB and 4 keys activation for the "I/O Check", designate input mode number 64.
2. By turning the microswitch ON and OFF manually ensure that the first bit alternates between 1 and 0.

5.20 Automatic Loader Cassette Adjustment and Parts Replacement

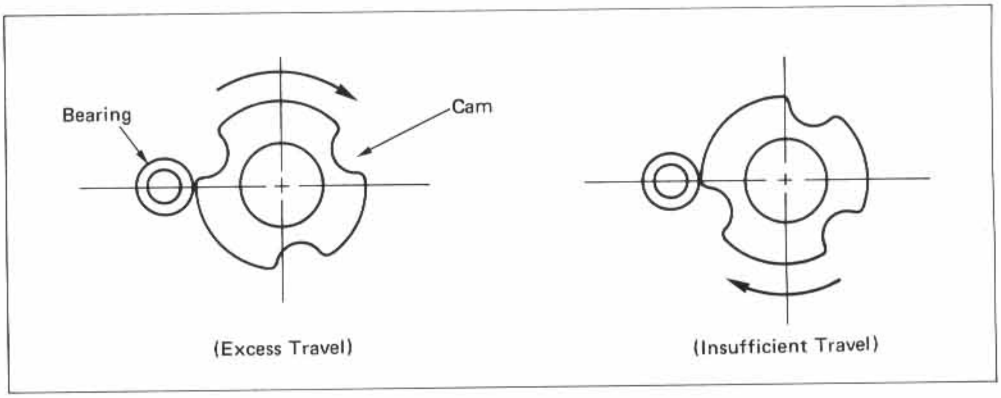
5.20.1 Belt Positioning Adjustment

1. Loosen the position determination cam set screw.
2. Attach leaders to the belt protrusions. While manually turning the belt make the leader trailing end attach itself to the claw.
3. With the bearing in the position determination cam, use the set screw to adjust and tighten the position of the determination cam so that the leader trailing end edge comes to within 1 mm of the claw.

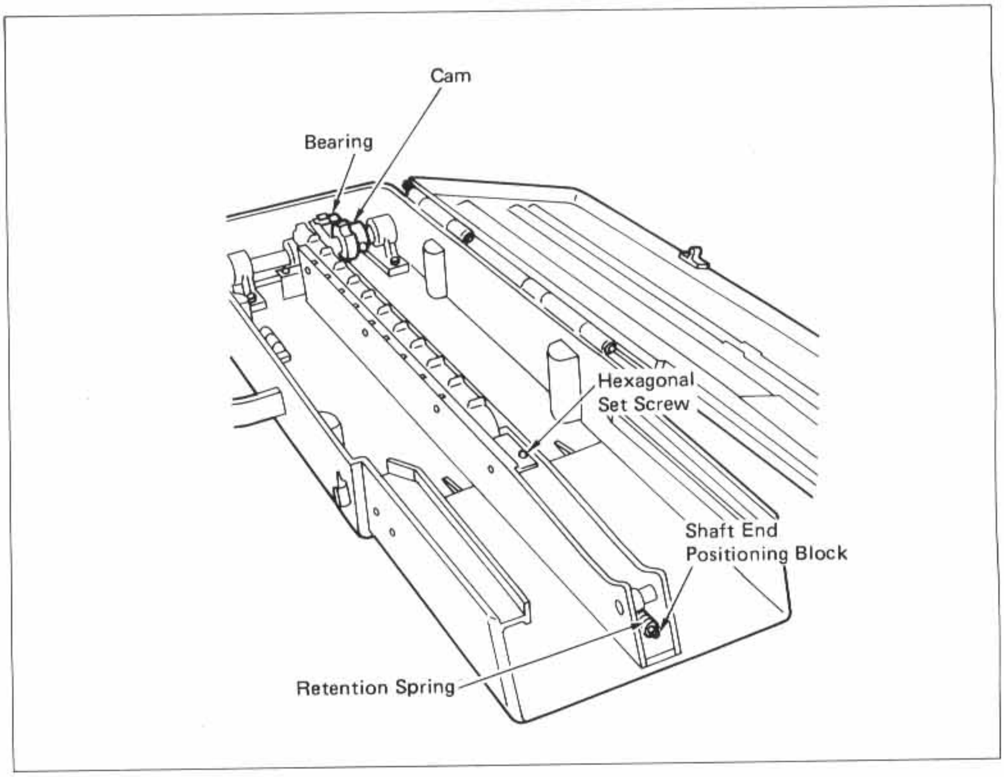


5.20.2 Leader Throughput Amount Adjustment

1. Using tape or the like temporarily maintain the cassette detection microswitch in the ON condition.
2. With the cassette cover opened set said cassette into the main body.
3. Allow the motor started by the automatic loader to run.
4. Check the degree to which the position determination cam and the bearing are out of proper interactive alignment.



5. Remove the cassette from the main body.
6. Loosen the hexagonal set screw.
7. Using a minus screw driver loosen the positioning block at the end of the throughput shaft and make adjustments so that the bearing comes to rest in the centers of the positioning cam indentations.

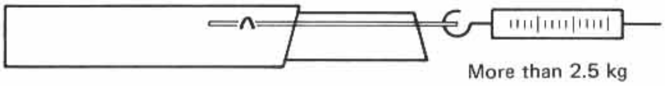


5.20.3 Leader Retention Tension Measurement and Adjustment

- On the inside of the cassette there is maintained against the throughput belt a limiter that guards against inadequate leader withdrawal.

(Tension Measurement Method)

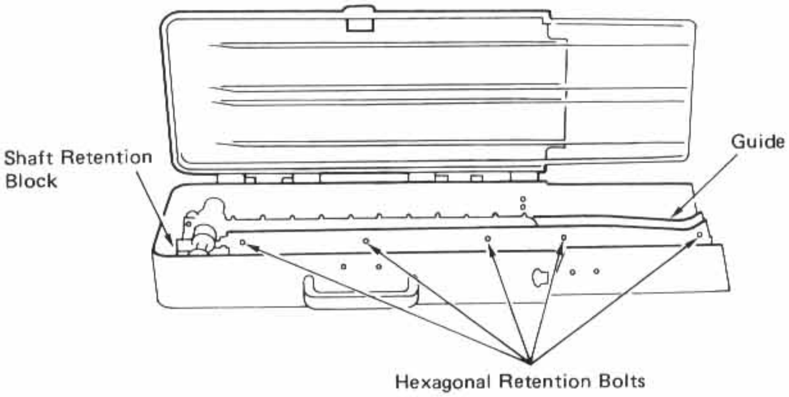
1. Set a leader in the forward most position of a cassette and close the cassette cover.
2. Attach a 5 kg spring scale to the forward most leader hole and by pulling in a horizontal direction measure the amount of pull required to move the leader.



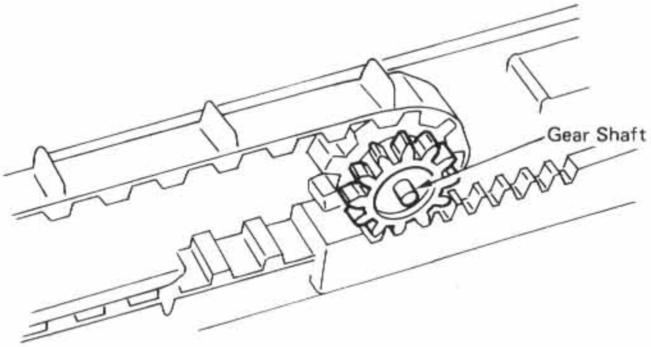
3. If the measured pull is less than 2.5 kg the shaft retention spring should be replaced.

5.20.4 Belt Replacement

1. Remove the hexagonal retention bolts from the leader guide and remove the guide.



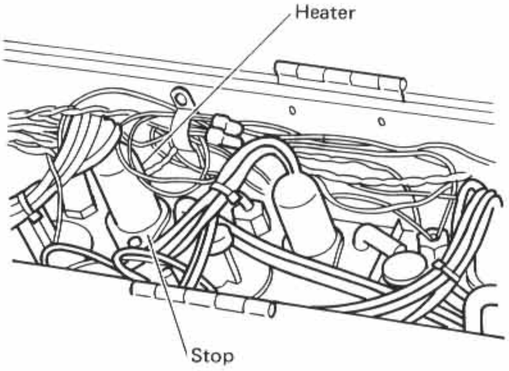
2. Remove the gear, the shaft, and the leader positioning belt.
3. Remove two screws and remove the right-hand side shaft retention block.



4. Remove the damaged belt and replace it with a new one.
5. Return all parts to their rightful locations by completing steps that are the reverse of the initial take apart procedures.
6. After all parts are tightened in their proper positions, make adjustments by following the procedures outlined in section 50.20.1.

5.21 Processing Heater Replacement

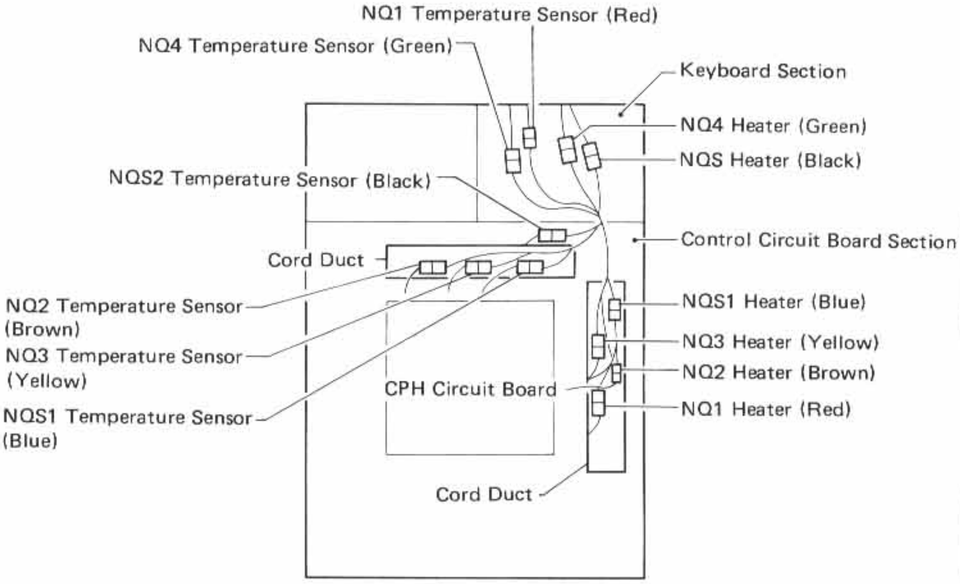
1. Remove the subtank section cover.
2. Loosen the heater retaining stop screw and slide the stop as appropriate.



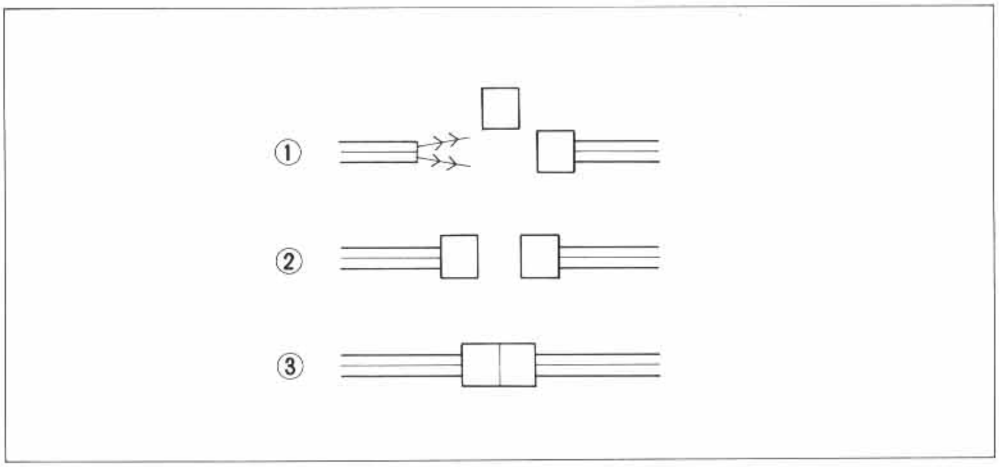
3. Cut off the heater wire (black) and sensor wire (brown), and then remove the in-solution heater.

   CAUTION: Ensure that dripping solution does not contaminate other solutions or component parts.

   Before removing the bad heater, disconnect its connector.


NQ1 Temperature Sensor (Red)
NQ4 Temperature Sensor (Green)
Keyboard Section
NQ4 Heater (Green)
NQS Heater (Black)
NQS2 Temperature Sensor (Black)
Control Circuit Board Section
Cord Duct
NQS1 Heater (Blue)
NQ2 Temperature Sensor (Brown)
NQ3 Heater (Yellow)
NQ3 Temperature Sensor (Yellow)
NQ2 Heater (Brown)
CPH Circuit Board
NQ1 Heater (Red)
NQS1 Temperature Sensor (Blue)
Cord Duct

4. Remove the cut heater wire (sensor wire) from the connector section.
5. Route a new heater wire without the connector, toward the mating connector section ①, then connect the connector to the new heater wire end ② and connect this connector to the mating connector ③.



The following in-solution heaters are employed (the capacity ratings are printed on the heater surfaces).

Overseas Version

NQ1, NQ3	240 V, 288 W
NQ2, NQS1, NQS2, NQ4	240 V, 200 W

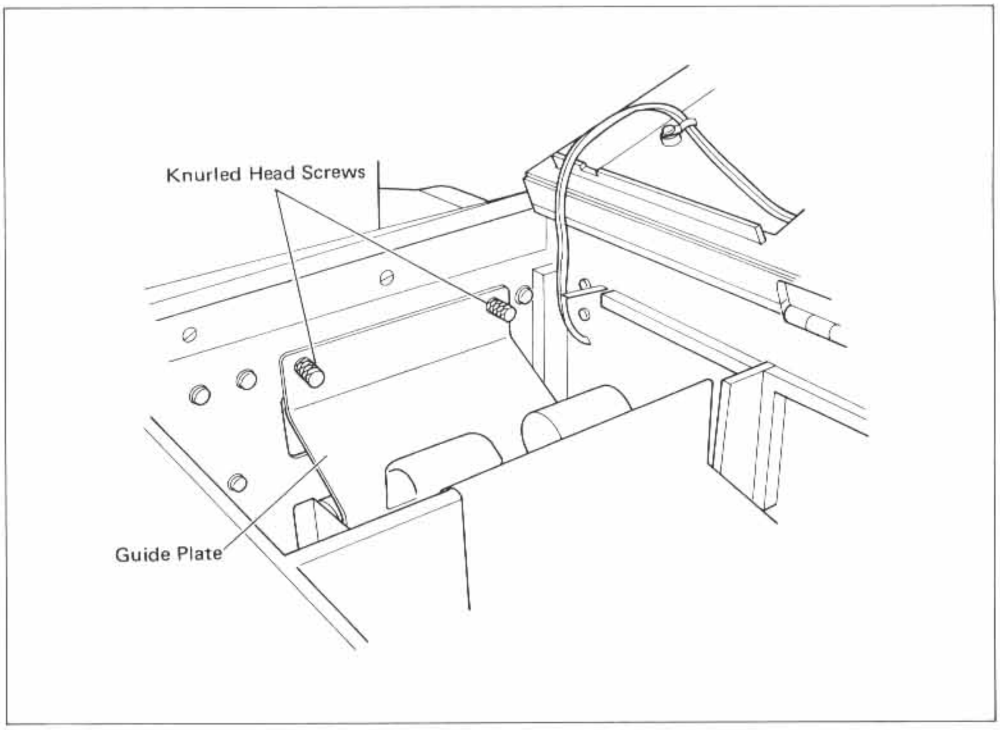
6. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

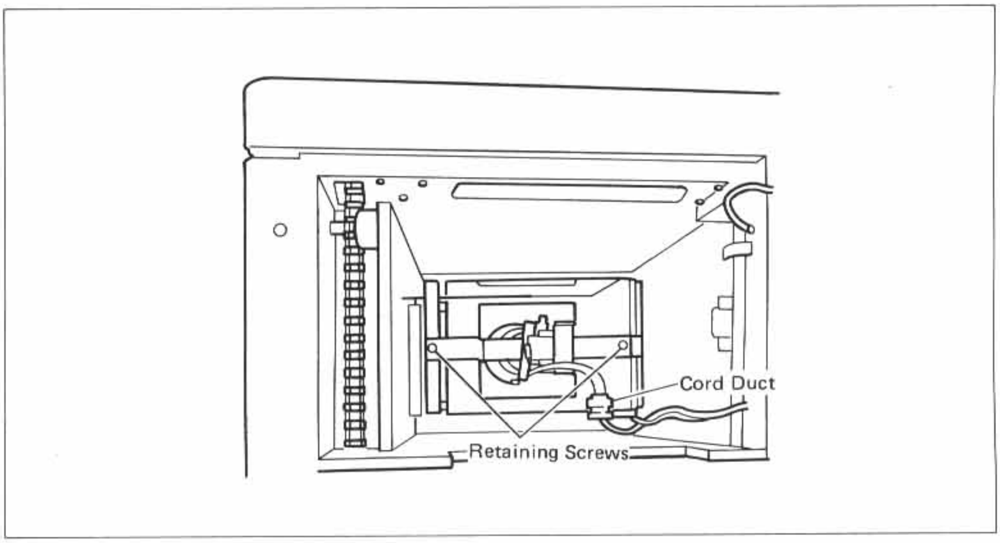
1. Turn on the POWER switch and wait until operating temperatures are reached.
2. Select the processing solution temperature checkout mode by pressing the MODE I SUB and I keys in sequence and insure that the newly installed heater induces proper temperature control.
3. Also make sure that it takes not more than 90 minutes to increase the temperature from 20 to 38°C (68 to 100.4°F).
4. Calibrate the displayed temperature indication. (See section 7.1.2.)

5.22 Dryer Heater Replacement

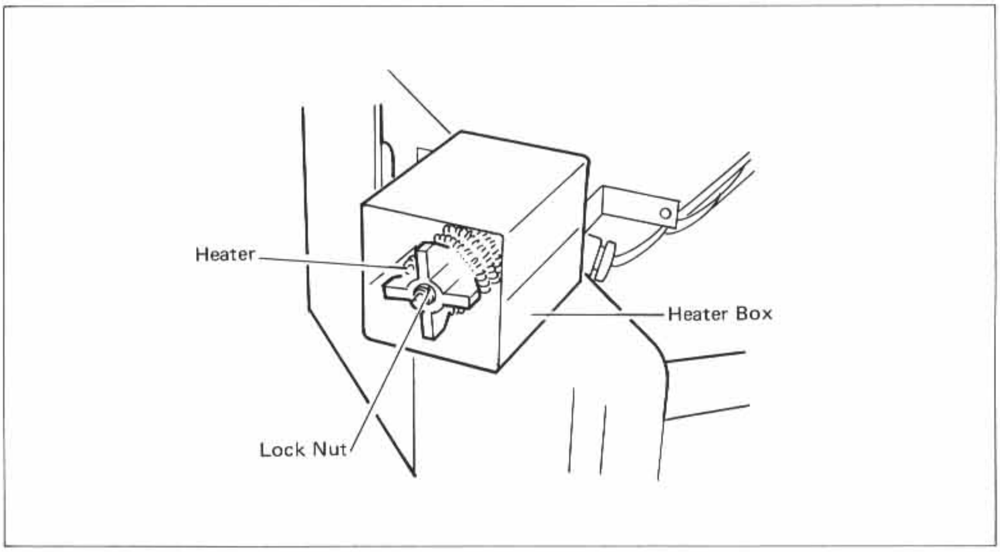
1. Open the processing section cover.
2. Take off the dryer section guide plate after removing its two knurled head screws.



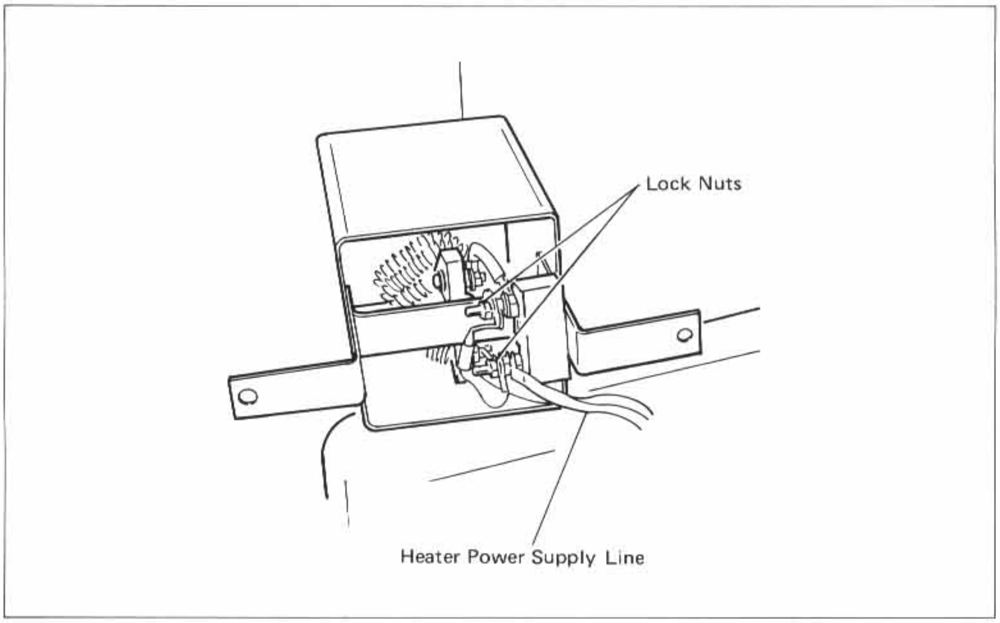
3. Remove crossover rack No. 7 and then take out the dryer rack.
4. Unscrew the heater unit, remove the cord duct, and lift the heater unit up and out.



5. Remove the heater lock nut located in the lower part of the heater unit.



6. Remove the heater power supply line retaining nuts, then take the heater out of the heater box.



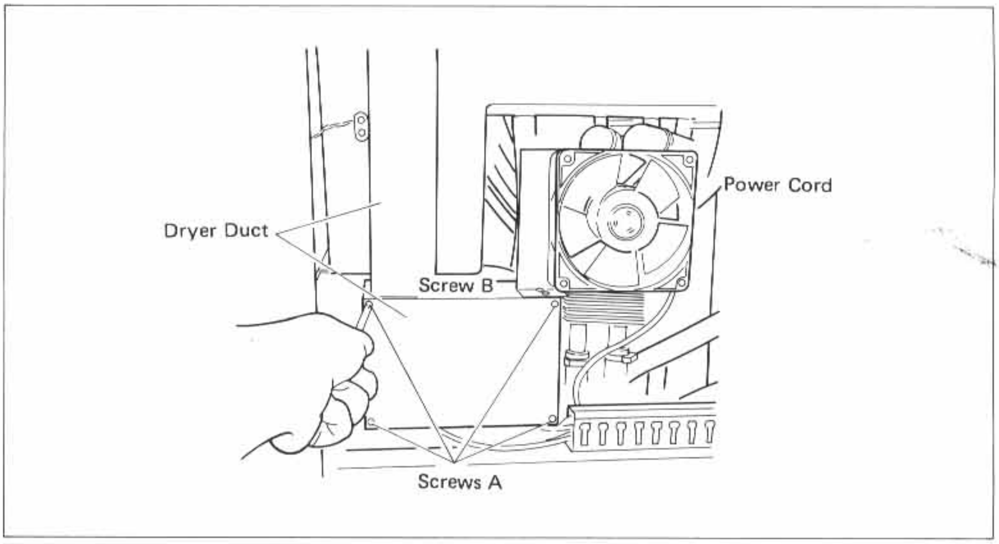
7. Disconnect the wire from the removed heater and connect said wire to a new heater.
8. Install the heater in the heater box and connect the power supply line to the heater.
   NOTE: Heater capacity is as follows.
   Overseas version – 240 V, 1 kW
9. Complete reinstallation in an order that is the reverse of removal.
   NOTE 1: When installing the dryer heater unit, use care not to let the screws fall into the dryer fan section.
   NOTE 2: When installing the heater unit, be sure not to damage the heater unit.

< Post-replacement Checkout >

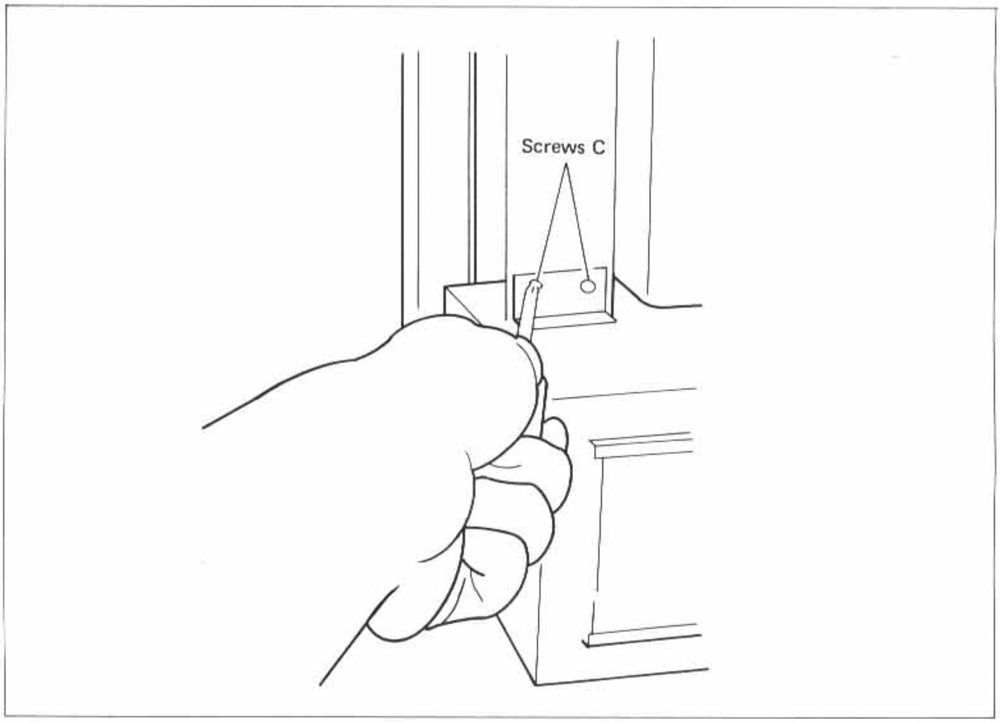
1. After operating temperatures have been reached, press the START switch to activate the drive system.
2. Select the temperature adjustment mode by pressing the MODE 5 SUB and 2 keys in sequence. Ensure that the preset dryer temperature is reached within 5 minutes.
3. Calibrate the displayed temperature indication. (See section 7.1.2.)

5.23 Dryer Fan Replacement

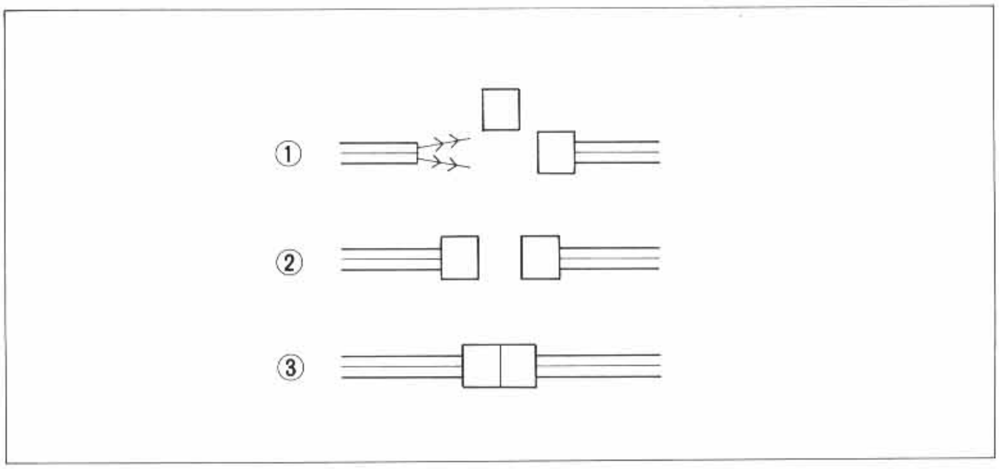
1. Remove the maintenance access cover.
2. Take off the dryer fan duct front cover after removing screws A.



3. Disconnect the NQS cooling fan power cord.
4. Remove screws C from the fan duct joint.



4. Remove the cut heater wire (sensor wire) from the connector section.
5. Route a new heater wire without the connector, toward the mating connector section ①, then connect the connector to the new heater wire end ② and connect this connector to the mating connector ③.



The following in-solution heaters are employed (the capacity ratings are printed on the heater surfaces).

Overseas Version

NQ1, NQ3	240 V, 288 W
NQ2, NQS1, NQS2, NQ4	240 V, 200 W

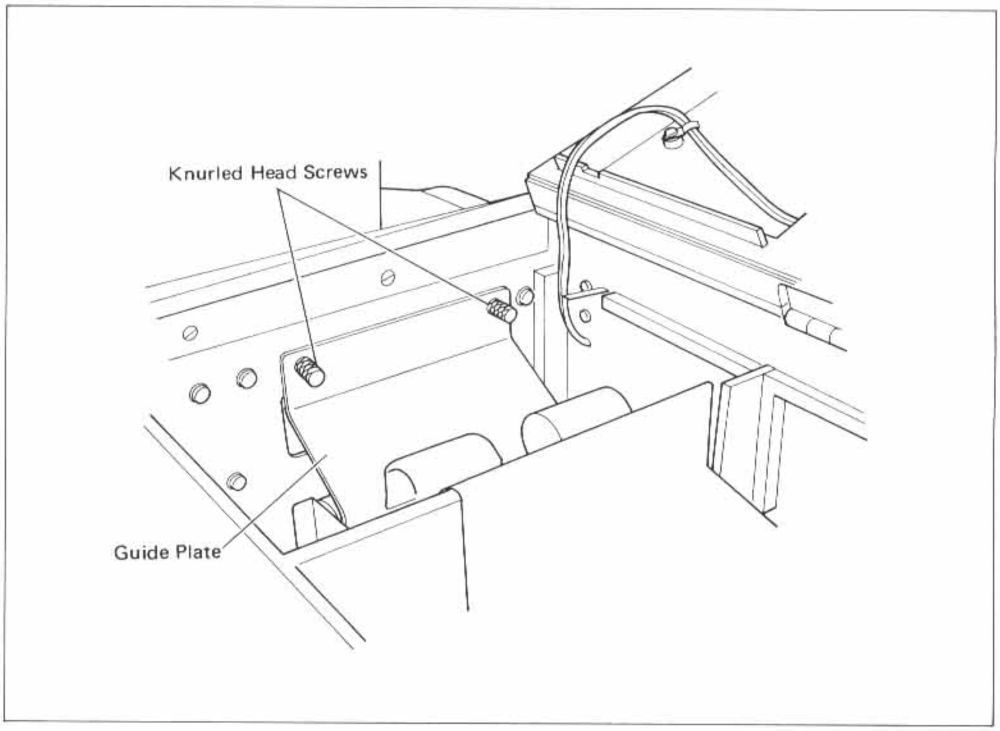
6. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

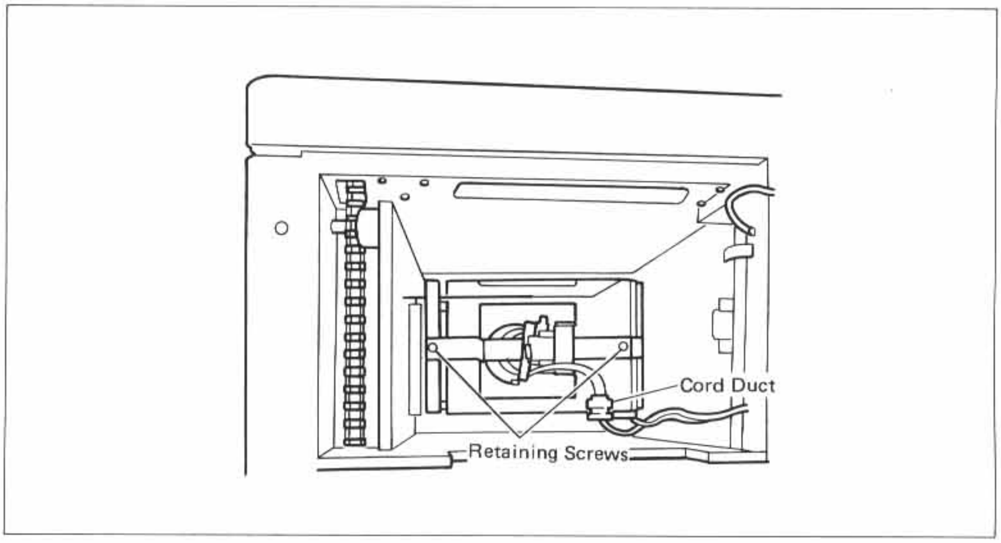
1. Turn on the POWER switch and wait until operating temperatures are reached.
2. Select the processing solution temperature checkout mode by pressing the MODE I SUB and I keys in sequence and insure that the newly installed heater induces proper temperature control.
3. Also make sure that it takes not more than 90 minutes to increase the temperature from 20 to 38°C (68 to 100.4°F).
4. Calibrate the displayed temperature indication. (See section 7.1.2.)

5.22 Dryer Heater Replacement

1. Open the processing section cover.
2. Take off the dryer section guide plate after removing its two knurled head screws.

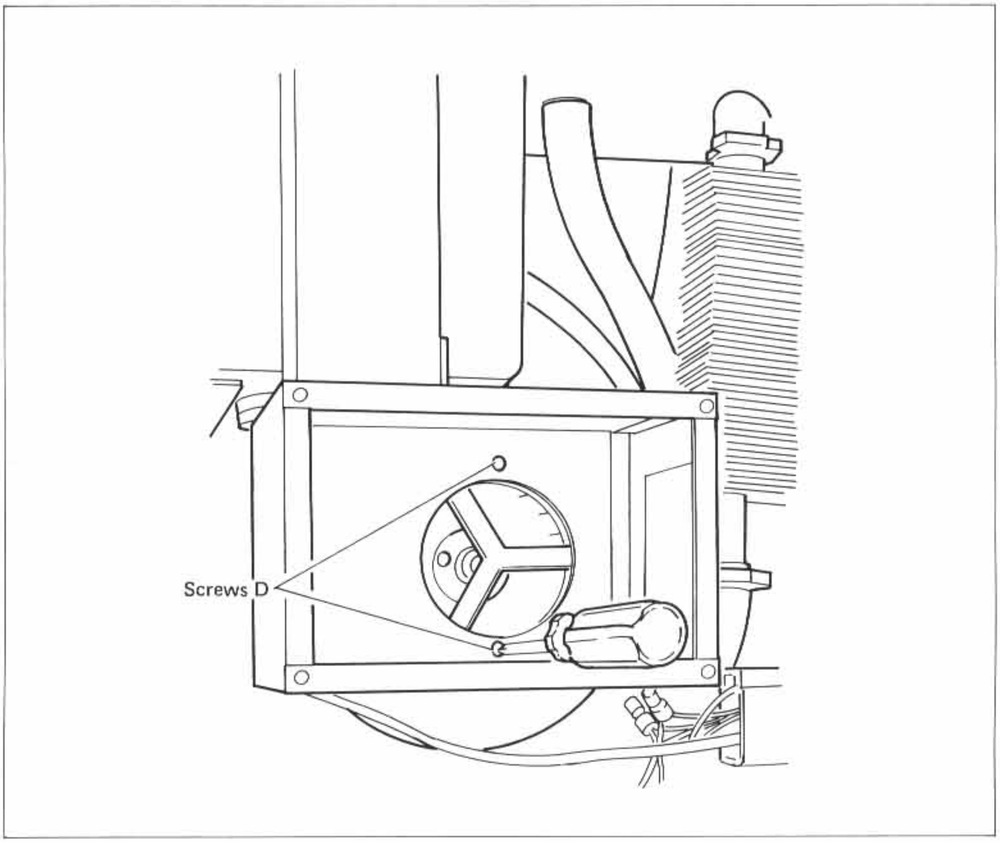


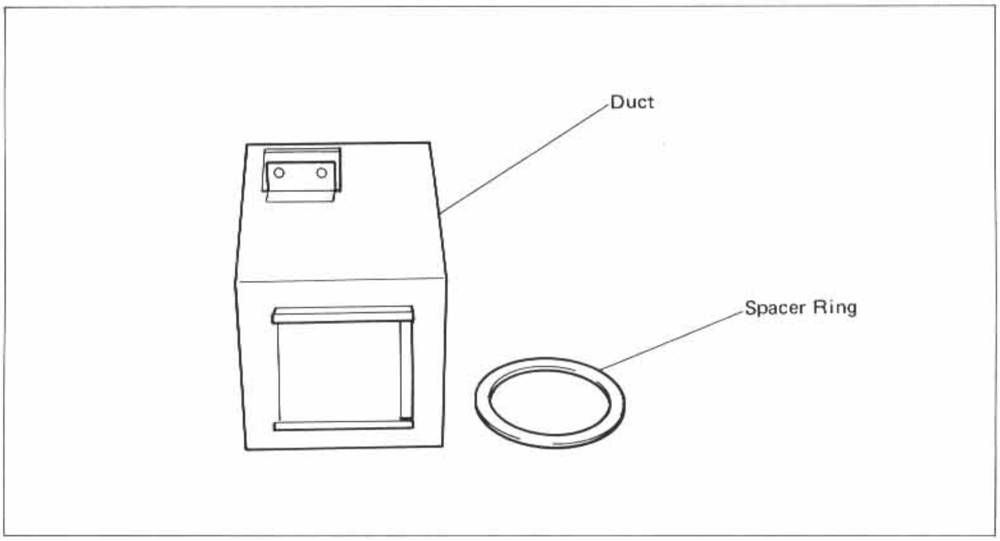
3. Remove crossover rack No. 7 and then take out the dryer rack.
4. Unscrew the heater unit, remove the cord duct, and lift the heater unit up and out.



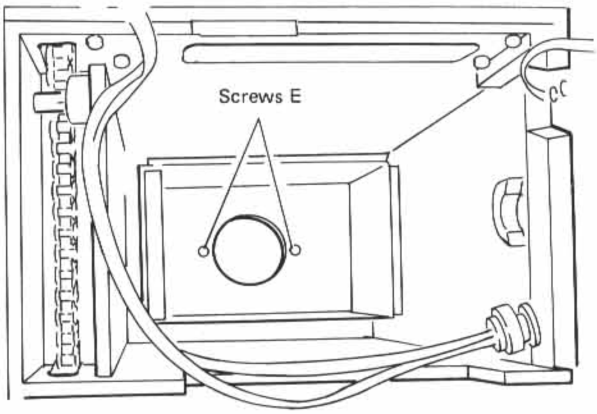
5. Remove screws D located inside the fan duct and take out the duct and spacer ring.

   NOTE: For equipment units with serial numbers 2601 and above, no spacer ring is incorporated.





6. Perform steps 1 through 4 in section 5.22.
7. Remove screws E from the dryer rack and take out the dryer fan.



NOTE: The dryer fan is secured to the rack interior. Therefore, to remove the dryer fan, remove the screws while having an assistant support the fan.

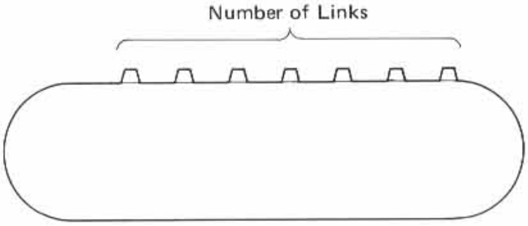
8. Disconnect the fan connector within the cord duct, then replace the fan.
9. Complete reinstallation in an order that is the reverse of removal.

< **Post-replacement Checkout** >

1. Select the dryer fan test mode by pressing the $\boxed{\text{MODE}}$ $\boxed{6}$ $\boxed{\text{SUB}}$ and $\boxed{3}$ keys in sequence and verify that the dryer fan operates properly.
2. With mode 0 selected, make sure that the dryer fan operates upon START switch activation.

5.24 Processing and Dryer Rack Transport Belt Replacement

The transport belt length varies with the rack. When transport belt replacement is to be made, be sure to use a belt that suits the particular rack.



Transport Belt

Rack Name	NQ1	NQ2	NQ3	NQS1	NQS2	NQ4	DRY
Belt Type	Endless Belt A	Endless Belt B	Endless Belt A	Endless Belt C	Endless Belt B	Endless Belt C	Endless Belt D
Number of Links	138	34	138	20	34	20	44

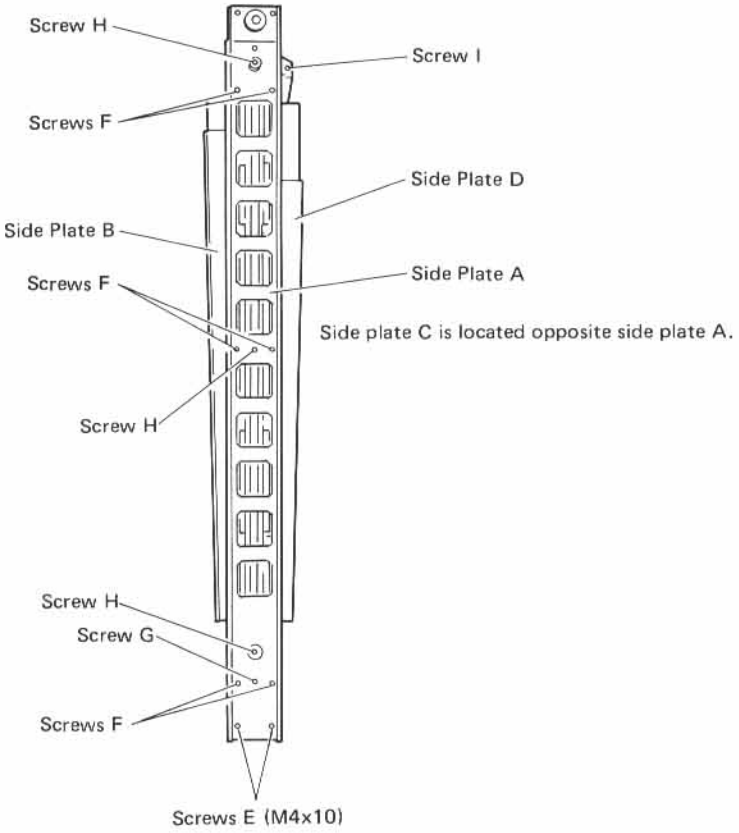
< Belt Replacement Precautions >

1. The transport belts withstand longitudinal tensile stress fairly well but are easily affected by torsional or bending stress. Use due care in handling the belts.
2. When the racks are being rebuilt the screws should be tightened with a torque driver to the extent outlined in the following table.

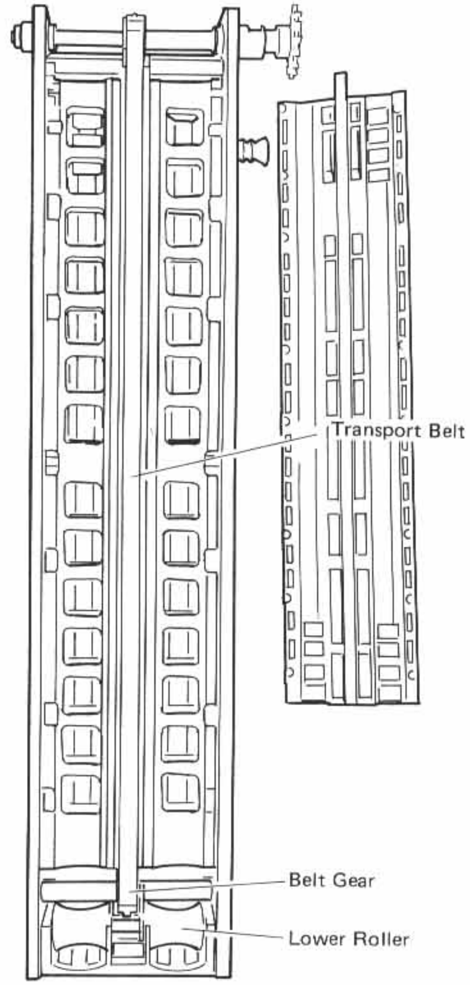
Threaded Screw Hole Material	Allowable Torque
Metal	10 kg/cm
Resin	6 kg/cm

5.24.1 NQ1/NQ3 Rack Endless Belt (A) Replacement

1. Take out the lower roller unit after removing screws E (4 locations) from side plates A and C.
2. Take off side plate A after removing screws F through I (10 in total) from side plate A.
3. Take off side plates B and D after removing screws F (6 locations) from side plate C.

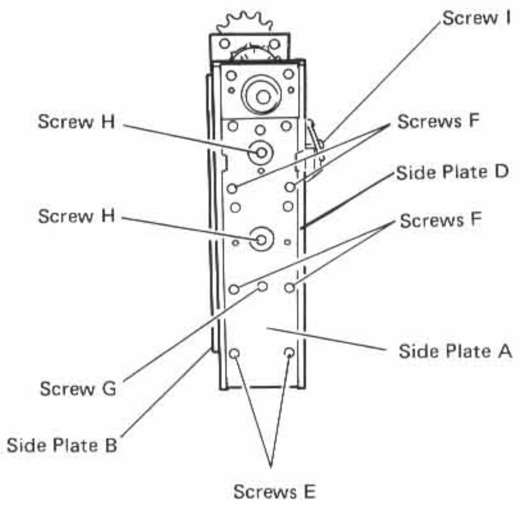


4. Remove screw G from side plate C. Remove the belt gear and mounting shaft as an assembly from the belt.



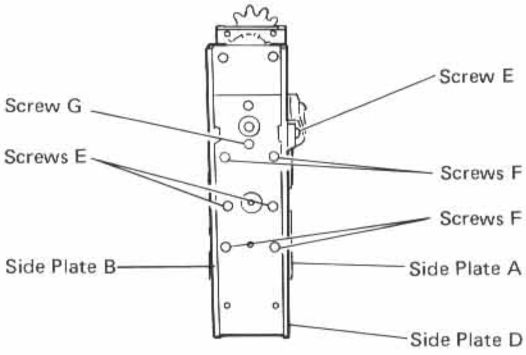
5. Replace the belt with a new one.
6. Complete reinstallation in an order that is the reverse of removal.

5.24.2 NQ2/NQS2 Rack Endless Belt (B) Replacement



1. Take out the lower roller unit after removing screws E (4 locations) from side plates A and C.
2. Take off side plate A after removing screws F through I (7 in total) from side plate A.
3. Take off side plates B and D after removing screws F (4 locations) from side plate C.
4. Remove screw G from side plate C. Take out the belt gear and mounting shaft as an assembly from the belt.
5. Replace the belt with a new one.
6. Complete reinstallation with the new belt.

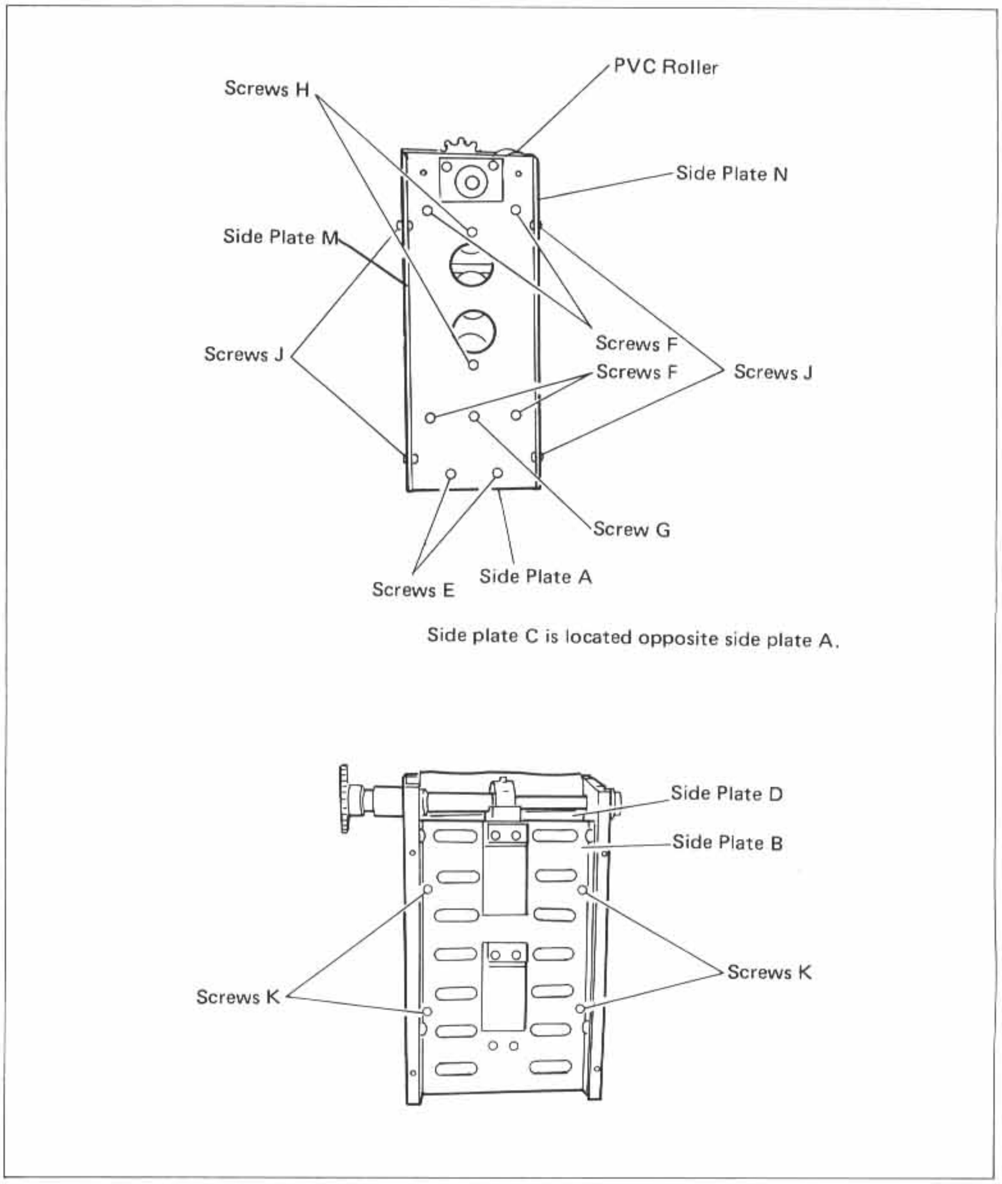
5.24.3 NQS1/NQ4 Rack Endless Belt (C) Replacement



Side plate C is located opposite side plate A.

1. Take out side plates B and D after removing screws F and I (9 in total) from side plates A and C.
2. Take out the lower roller unit after removing screws E (4 locations) from side plates A and C.
3. Take out side plate A after removing its retaining screw G.
4. Remove screw G from side plate C. Remove the belt gear and mounting shaft as an assembly from the belt.
5. Replace the belt with a new one.
6. Complete reinstallation in an order that is the reverse of removal.

5.24.4 Dryer Rack Endless Belt (D) Replacement



Side plate C is located opposite side plate A.

1. Take off side plates M and N after removing screws J (nut attached, 8 locations).
2. Take out the upper PVC roller after removing its nut.
3. Remove screws F (nut attached, 8 locations) from side plates A and C.
4. Remove screws E (4 locations) from side plates A and C, then take out the lower roller.
5. Take off side plate A after removing screws H and G.
6. Remove screws K (4 locations) from side plate B and take out side plates B and D.
7. Remove screw G from side plate C, then take out the belt gear and mounting shaft as an assembly.
8. Replace the belt with a new one.
9. Complete reinstallation in an order that is the reverse of removal.

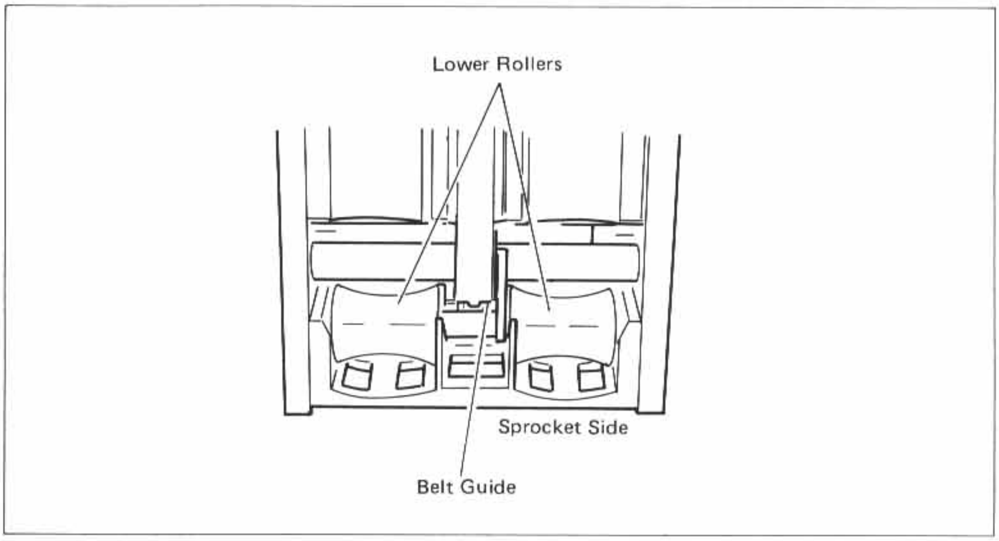
   Screw E – M4 x 8
   Screw F/J – M4 x 6, nut attached
   Screw G/H – M4 x 10
   Screw K – M4 x 6

5.24.5 Rack Reassembly Precautions

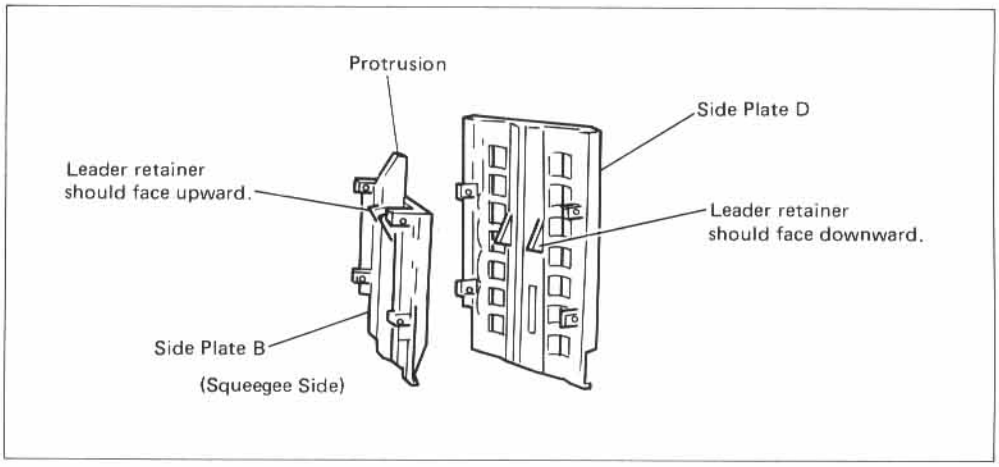
When reassembling the racks, observe the following precautions.

1. Note that the following screws are used for the racks.
   (1) NQ1, NQS1, NQS2, NQ4 – SUS316, M4 x 10
   (2) NQ2, NQ3 – Titanium, M4 x 10
   Titanium, M4 x 6

   CAUTION: Use care to avoid screw overtightening.
2. When reinstalling the lower roller unit, ensure that the belt guide is positioned toward the sprocket.



3. Be sure that the transport belt runs along the belt guides of side plates B and D.
4. Ensure that side plates B and D are reinstalled as indicated below.


Protrusion
Side Plate D
Leader retainer should face upward.
Leader retainer should face downward.
Side Plate B
(Squeegee Side)

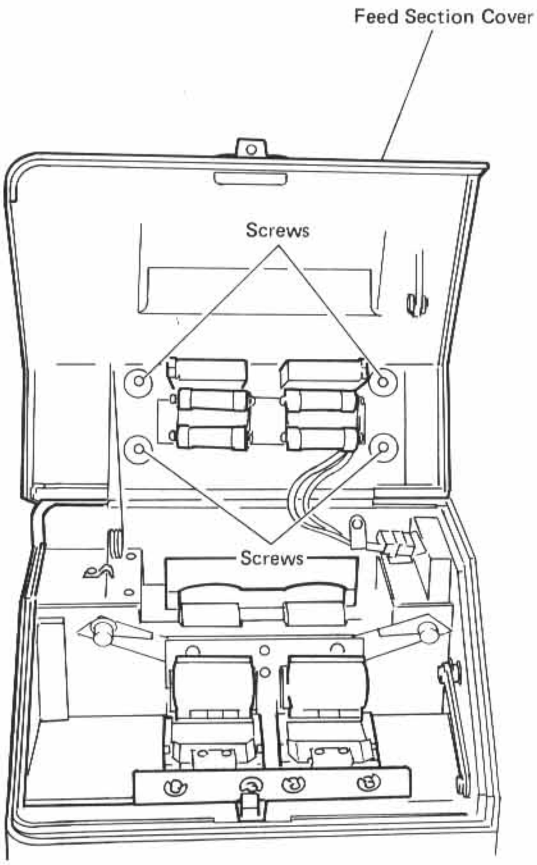
< Post-reassembly Checkout >

Rotate the rack sprocket by hand to ensure that a spliced leader and film combination travels without being scratched or obstructed.

5.25 Film Trailing End Cutter Blade Performance Adjustment

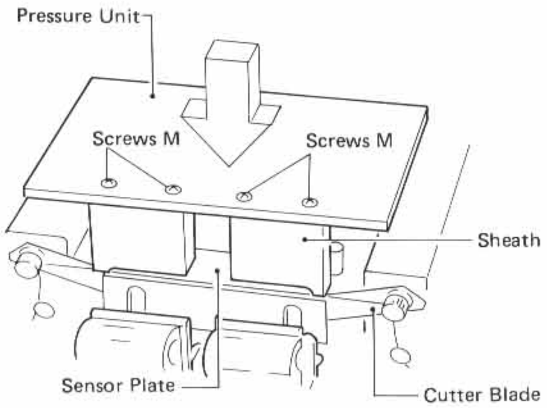
NOTE: When the cutting quality is not adequate with the FP350AL unit, follow the procedures outlined in section 5.15 and replace the cutter blade.

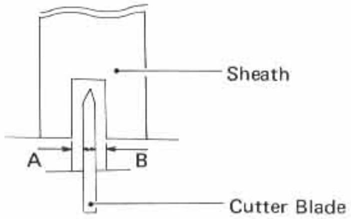
1. Remove the upper E-ring which retains the film feed section cover open-close arm.
   Turn the film feed section cover down over the processing section cover.



2. Remove the screws that secure the pressure unit to the cover.
   NOTE: Before removing the screws, be sure to mark the pressure unit mounting position with a pencil or the like.

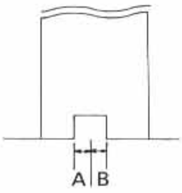
3. Make adjustments as directed below.
   1) Manually press the pressure unit against the sensor plate.
   2) With the above designated condition maintained, manually raise the cutter blade by moving the cutter blade pusher plate.
   3) Loosen screws M and reposition the blade sheath so that the cutter blade is centered with respect to the sheath groove.
4. Complete reinstallation in an order that is the reverse of removal.





A must be equal to B.

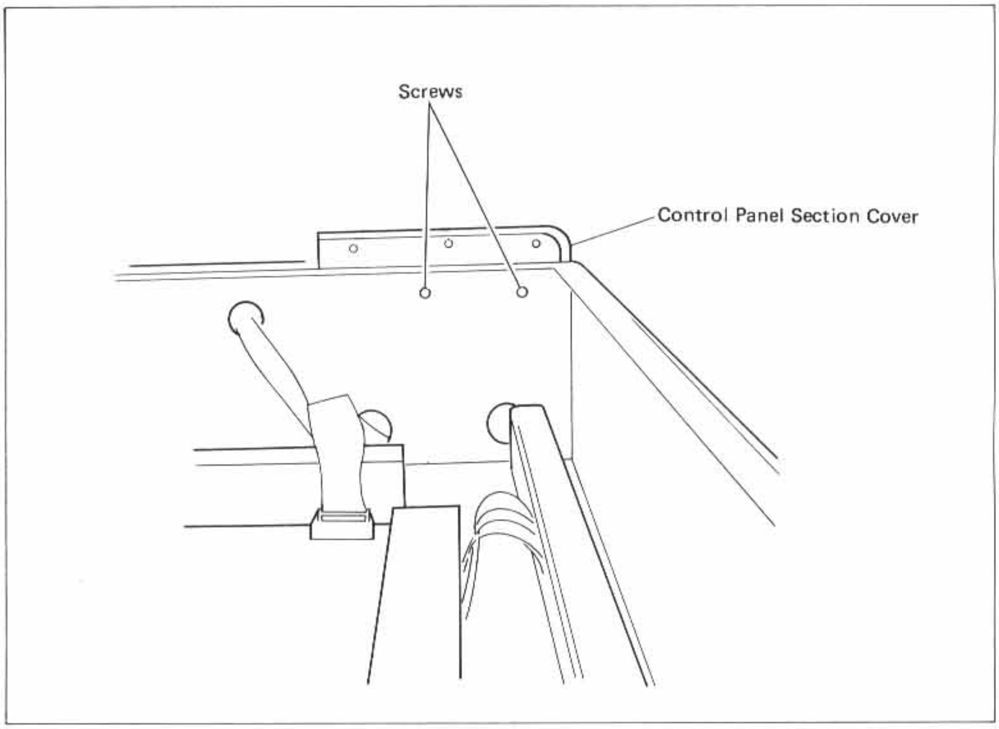
or



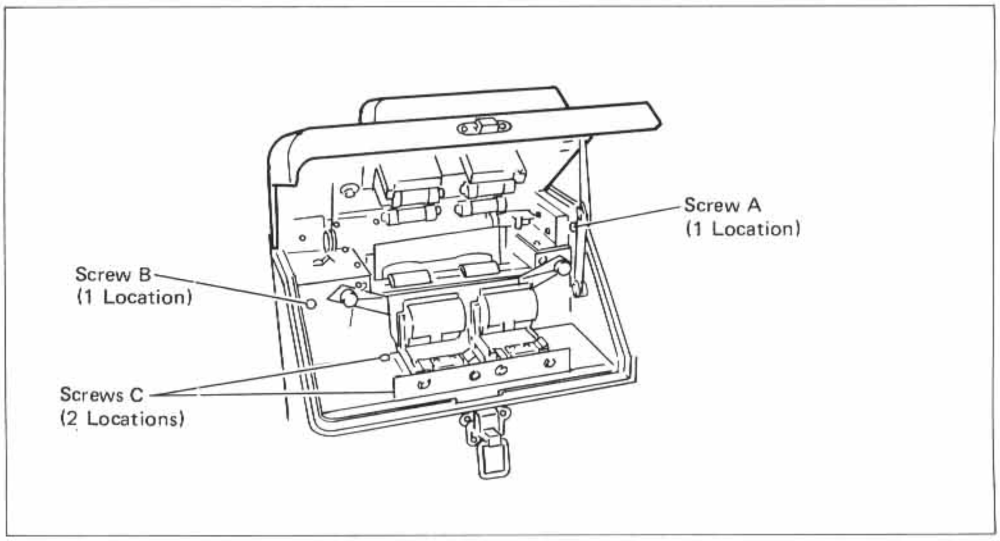
A and B must be equal.

5.26 Display/Keyboard Replacement

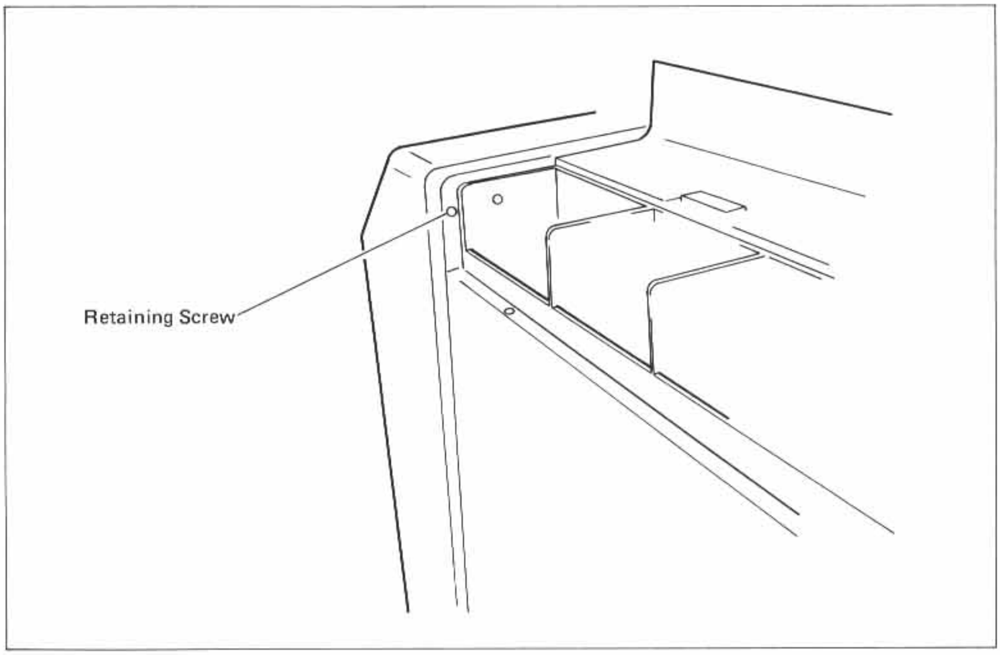
1. Uncover the control circuit board section and remove the two control panel section cover retaining screws,



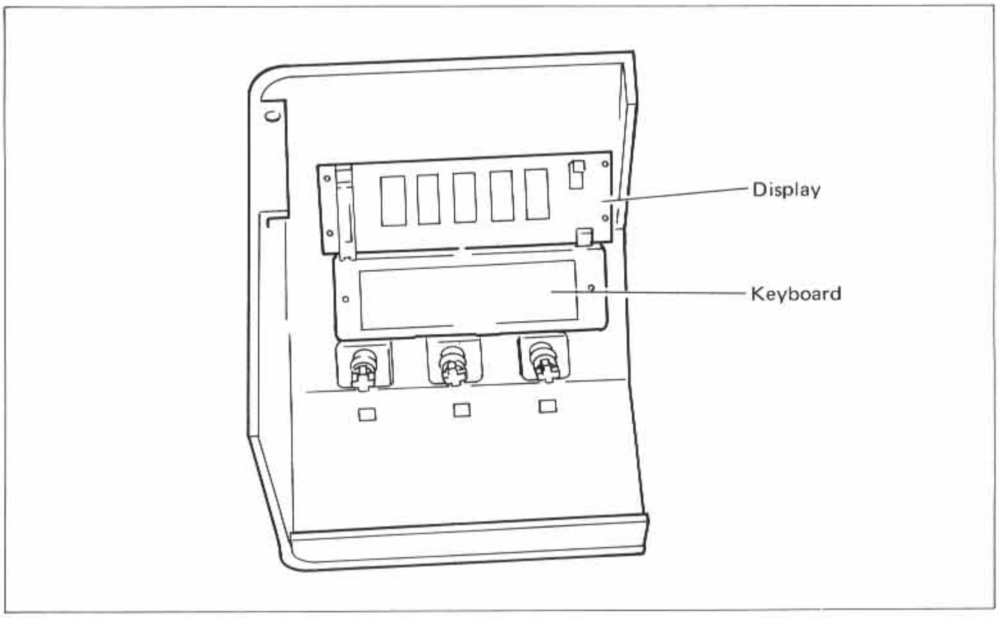
2. Remove the screws from within the film feed (input) section.



3. Open the replenisher tank section cover and remove the single-slot screw indicated below.



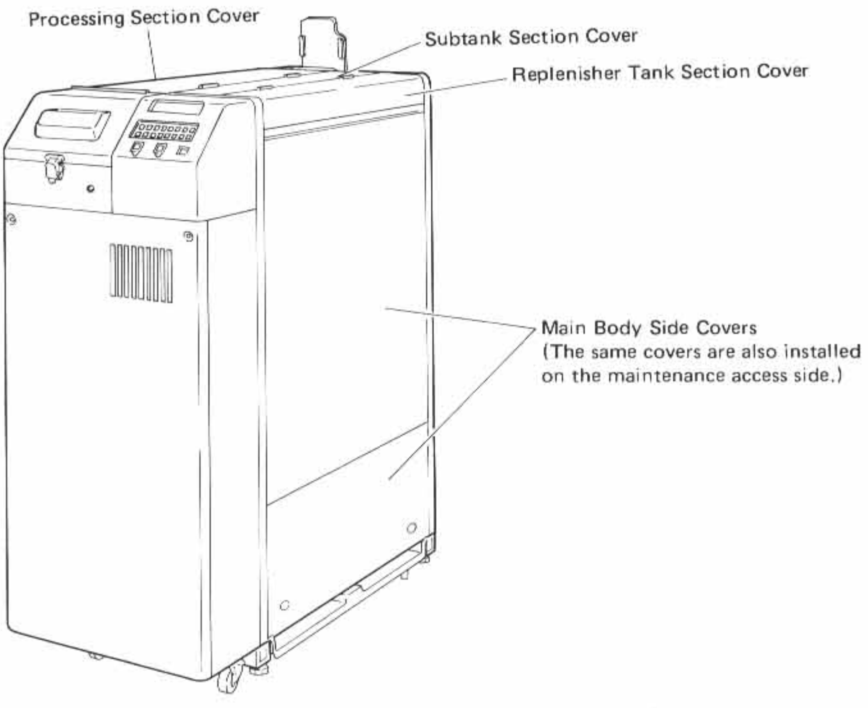
4. Slide the cover forward, disconnect the connectors, and replace the display/keyboard.



5. Complete reinstallation in an order that is the reverse of removal.

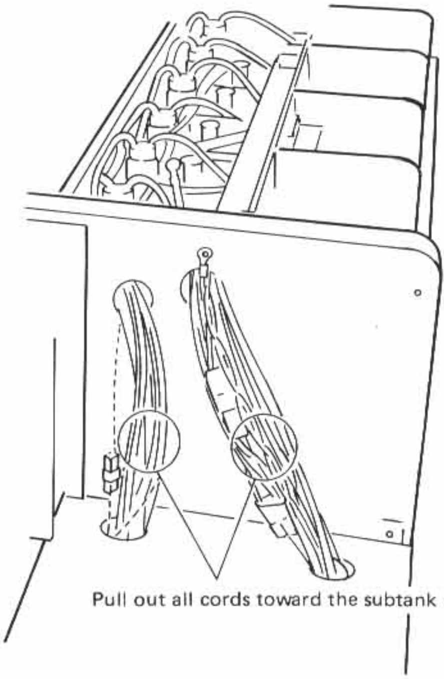
5.27 Processing Tank (Subtank Included) Replacement

1. Drain all processing and replenisher solutions.
2. Remove the processing section cover, subtank section cover, replenisher tank section cover, and main body side covers.

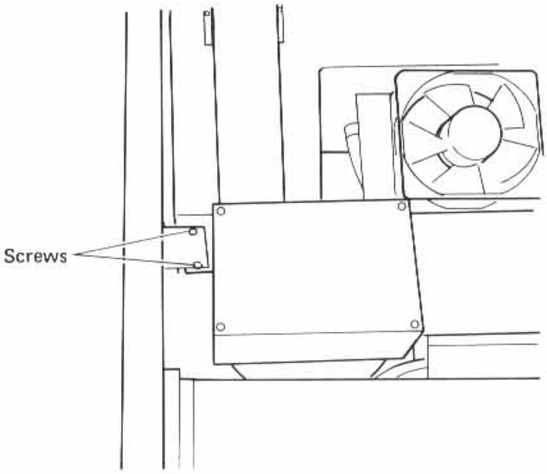

Processing Section Cover
Subtank Section Cover
Replenisher Tank Section Cover
Main Body Side Covers
(The same covers are also installed on the maintenance access side.)

3. Remove all replenisher tanks. (See section 5.1.)
4. Remove all processing racks.
5. Take off the control panel section cover.

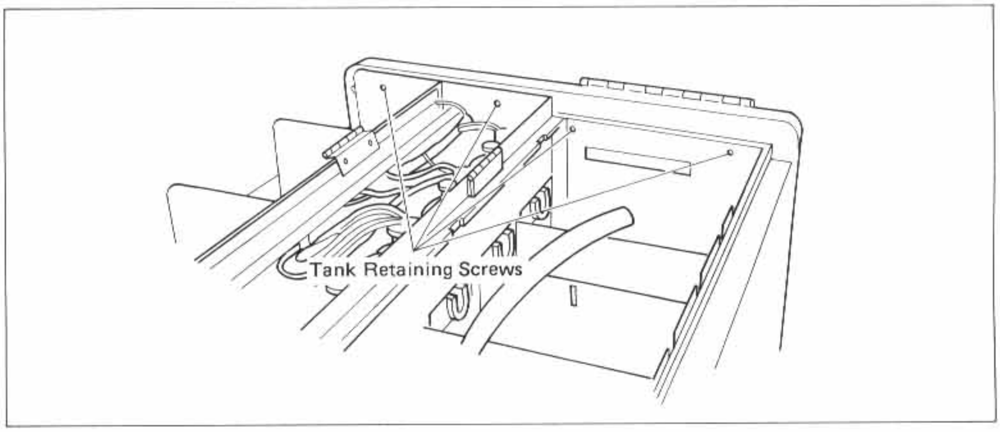
6. Disconnect all heater and sensor cords from the subtank section. If this removal is obstructed by the connectors, disconnect the pins from the connectors using the pin removal jig. (See section 5.7 and 5.21.)



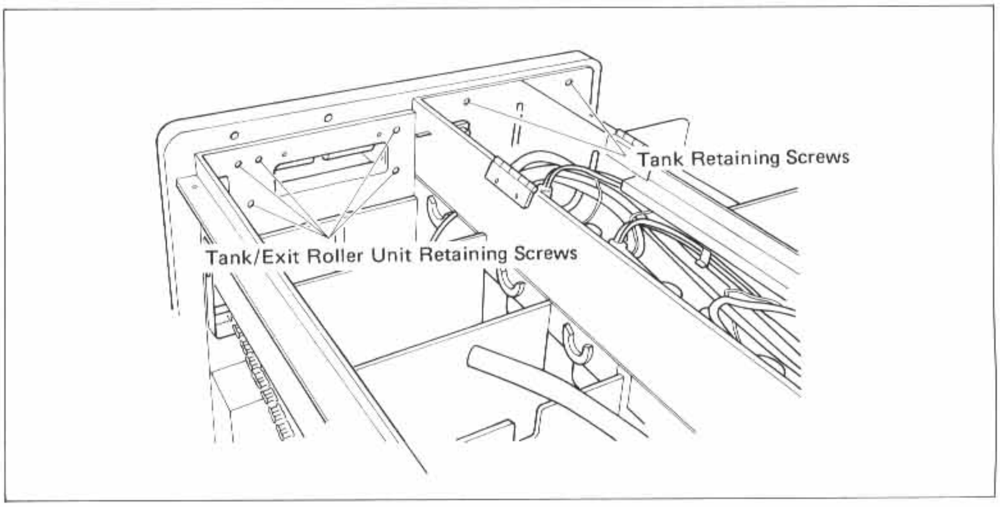
7. Disconnect the processing section cover detection microswitch fastening terminal, pull out its cord toward the control panel section, and take out the microswitch.
8. Remove the drive chain. (See section 5.4.)
9. Disconnect all hoses. (See section 1.5.)
10. Remove the dryer heater unit. (See section 5.23.)
11. Remove the dryer fan and duct. (See section 5.24.)
12. Remove the dryer temperature sensor and pull out the sensor cord toward the control panel section.
13. Remove the two dryer tank underside retaining screws.



14. Remove the processing tank retaining screws located toward the film feed end.



15. Remove the processing tank/exit roller unit retaining screws located toward the film discharge end.



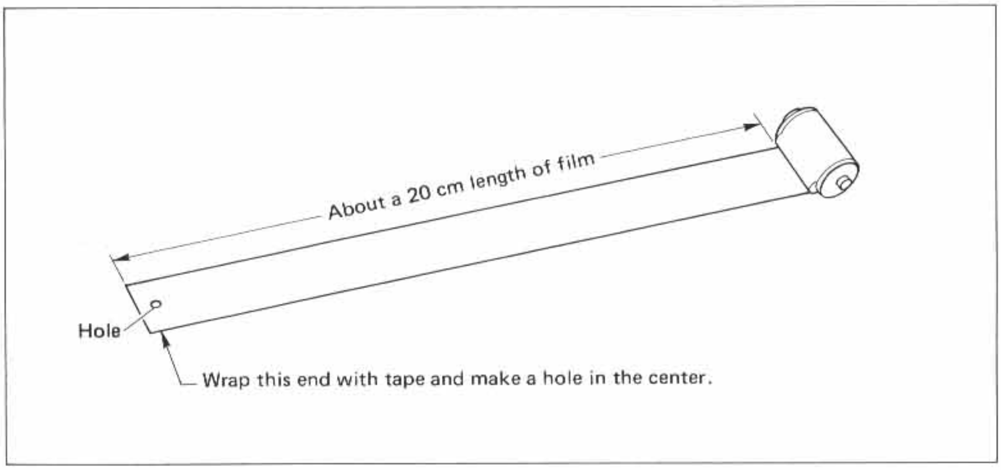
16. Remove the processing tank and subtank as an assembly from the processor body.
17. Remove the heater and other parts from the removed tank, and then mount these parts on a new tank.
18. Complete reinstallation in an order that is the reverse of removal.

< Post-replacement Checkout >

1. Charge the processor with water and turn on the POWER switch.
2. Wait for about an hour with the above state maintained, and then ensure that there are no water leaks or other problems.
3. Drain the water and then charge the processor with processing solutions. When the operating temperatures are reached, feed test film into the processor ensure that film processing and other sequential operations are functioning normally.

5.28 Film Magazine Movable Section Tension Check

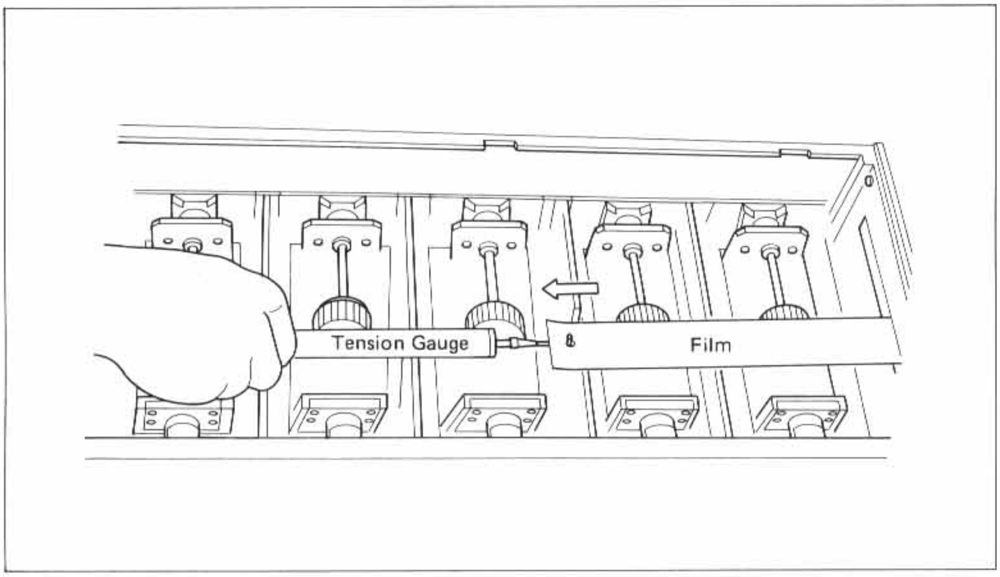
1. Have on hand the following film length and a 3 kg tension gauge.


About a 20 cm length of film
Hole
Wrap this end with tape and make a hole in the center.

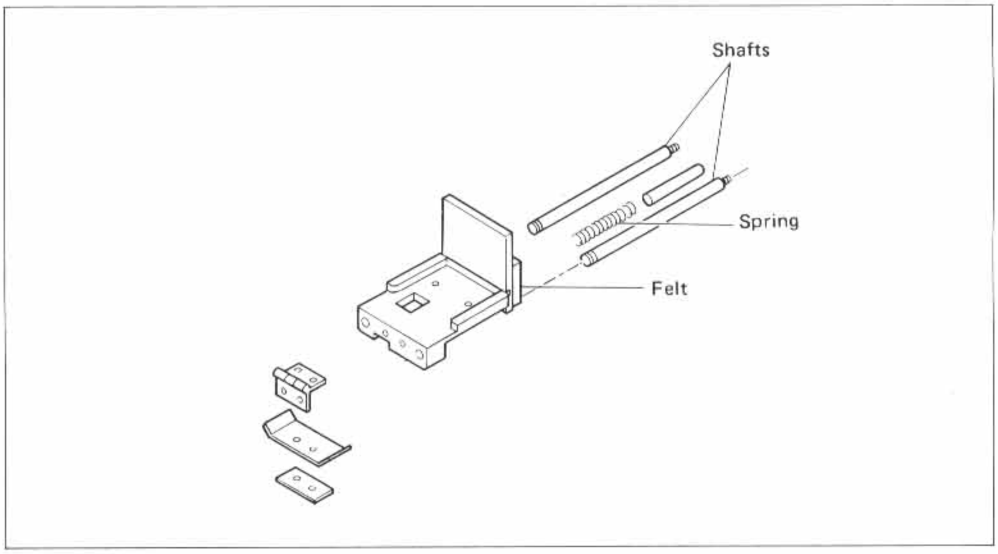
NOTE: Friction varies with film type. Therefore, be sure to use Fuji SUPER HR100 film for this check.

2. Remove crossover racks No. 1 through 7.
3. Set a cartridge in the magazine and pull out the film leading end until it comes to a position above the NQ1 processing tank.
4. Engage the tension gauge with the film leading end hole and pull the film in the direction of the arrow. (See the figure below.)

   NOTE: Be sure that the film is pulled horizontally.



5. Measure the tension prevailing under each of the following conditions and ensure that the measured values are as stated below.
   1 When the film trailing end pressure detection microswitch turns ON, the tension should be 0.8±0.2 kg.
   2 When the film cut detection microswitch turns ON, the tension should be 1.8±0.2 kg.
6. If the measured values are not as stated above, carry out the checks and replacements indicated below.
   (1) When the tension measured with the film trailing end pressure detection microswitch turned ON is smaller than 0.7 kg, replace the magazine movable section spring.



   (2) When the tension measured under the same conditions as above is greater than 0.9 kg, proceed as follows.
   - Shaft Cleaning
     Wipe the shafts clean with a cloth moistened with machine oil, and then wipe off the oil with a dry cloth.
   - Felt Check and Replacement
     Ensure that the installed shaft smoothly moves. If not, replace the felt.
   - Spring Check and Replacement
     Visually check the spring for torsion, inter-coil space unevenness, or other abnormalities. If any abnormality exists, replace the spring.

   If neither of the above cures work, replace the entire magazine movable section.

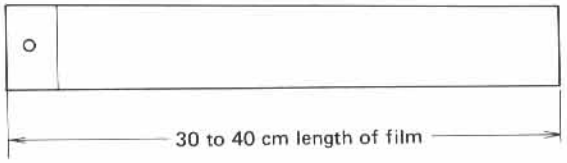
5.29 Film Transport Force Check with Film Trailing End Pressure Solenoid ON

The film transport force should be 5 kg or more.

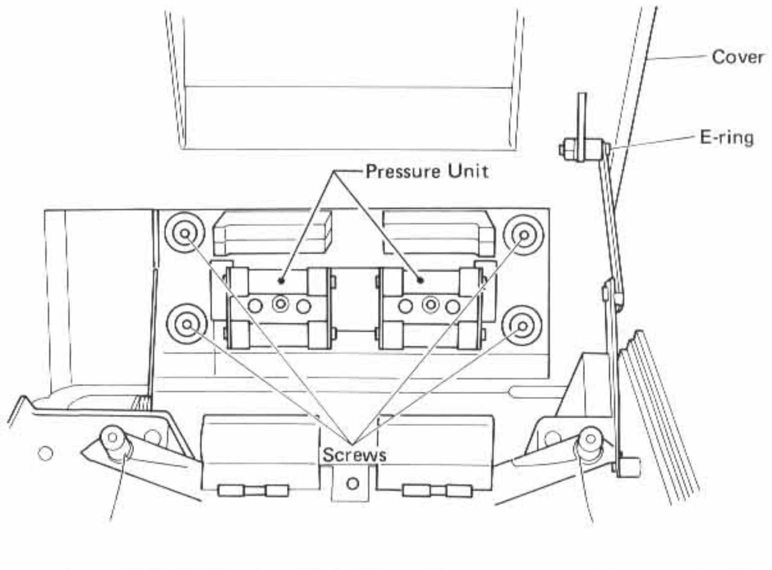
< Checkout Procedures >

1. Have on hand the following film length and a 10 kg tension gauge.

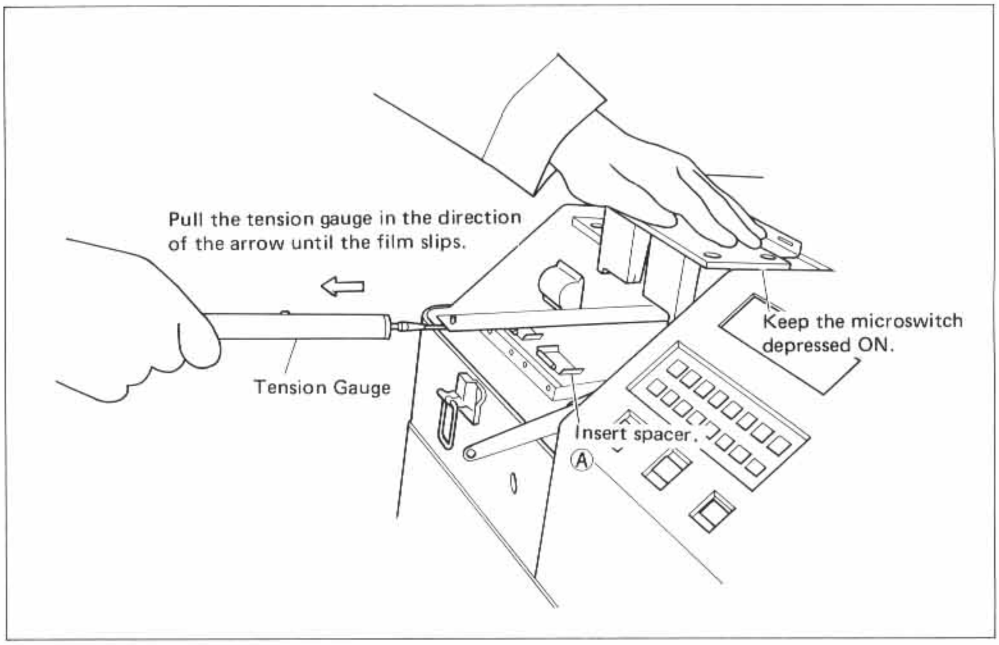
   NOTE: Friction varies with film type. Therefore, be sure to use an unexposed Fuji SUPER HR100 film.



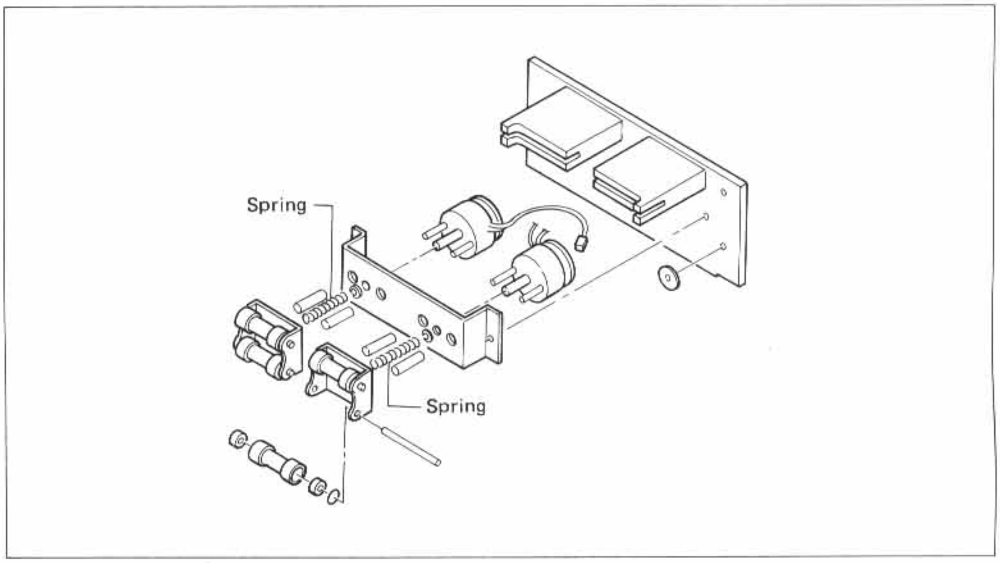
2. Remove the E-ring, the arm, the pressure unit retaining screws, and then the cover.



3. Join the leader to the untaped end of the film prepared in step 1.
4. Take out the magazine from the strand where the film is joined to the leader.
5. Insert a 6 to 7 mm thick spacer into location A (See the figure below.) so that the film trailing end pressure detection microswitch turns ON.
6. Ensure that the film feed section cover detection microswitch remains ON.
7. As shown in the figure below, while retaining the pressure roller unit by hand, start the drive system. Measure the film transport force when the film slips.


Pull the tension gauge in the direction of the arrow until the film slips.
Tension Gauge
Keep the microswitch depressed ON.
Insert spacer.
Ⓐ

8. When the measured transport force is smaller than 5 kg, replace the springs indicated in the figure below.



5.30 Screw Locking Bond Application List

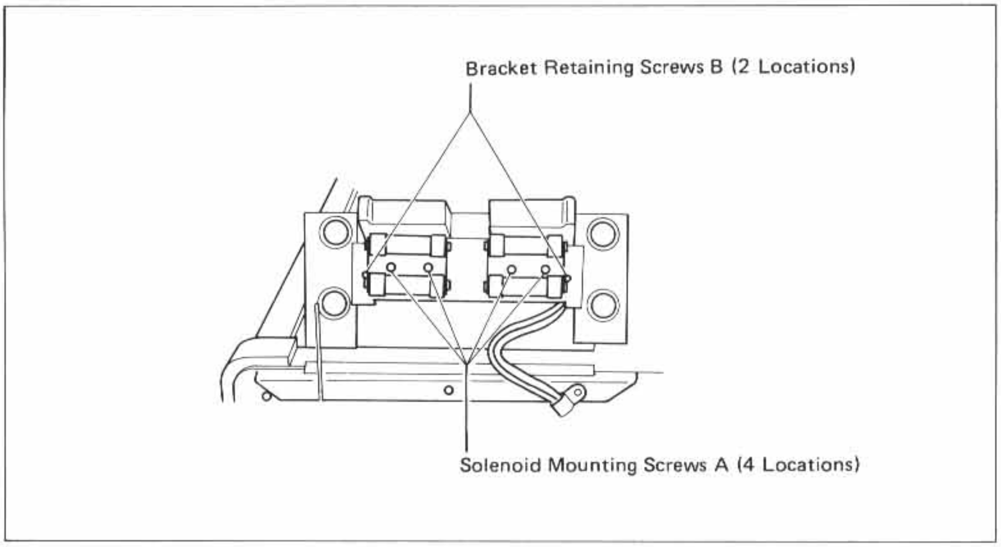
In the FP350, screw locking bond is applied to the following parts. When the listed parts are installed, do not fail to apply screw locking bond.

- Recommended screw locking bond: Three-Bond 1401C

1. Film feed section

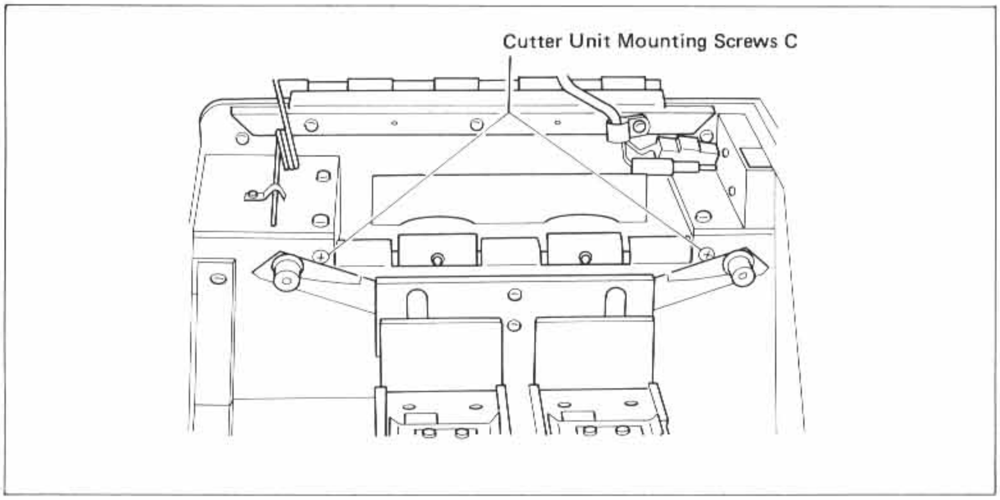
(1) Pressure roller unit section

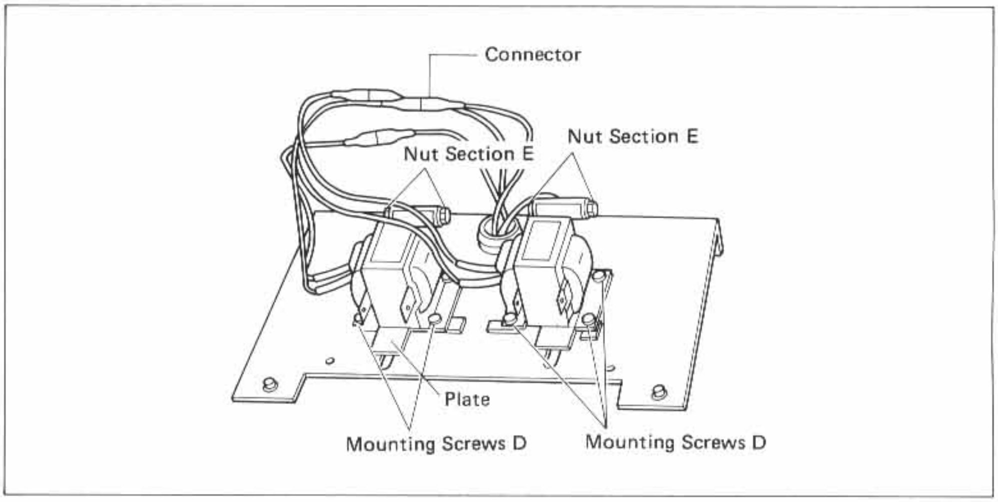
1 Solenoid mounting screws A
2 Solenoid bracket retaining screws B


Bracket Retaining Screws B (2 Locations)
Solenoid Mounting Screws A (4 Locations)

(2) Film trailing end cutter blade drive section

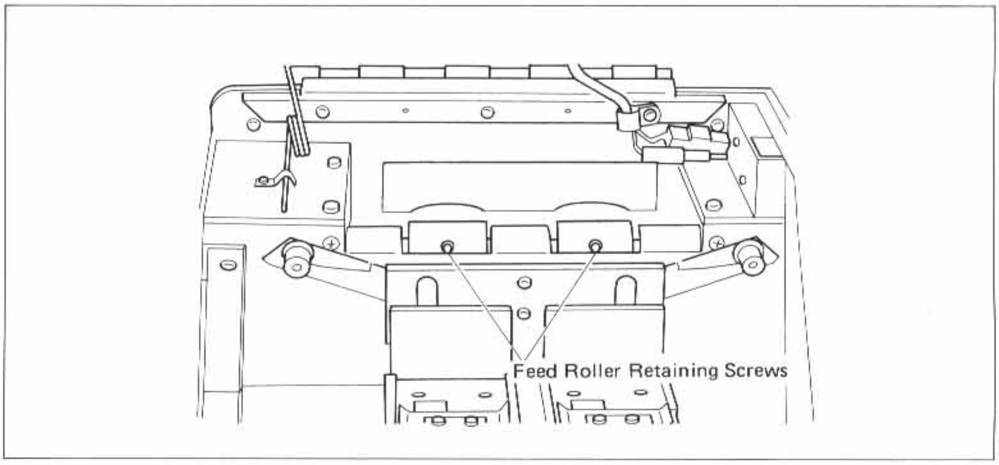
1 Cutter unit mounting screws C
2 Solenoid mounting screws D
3 Nuts E

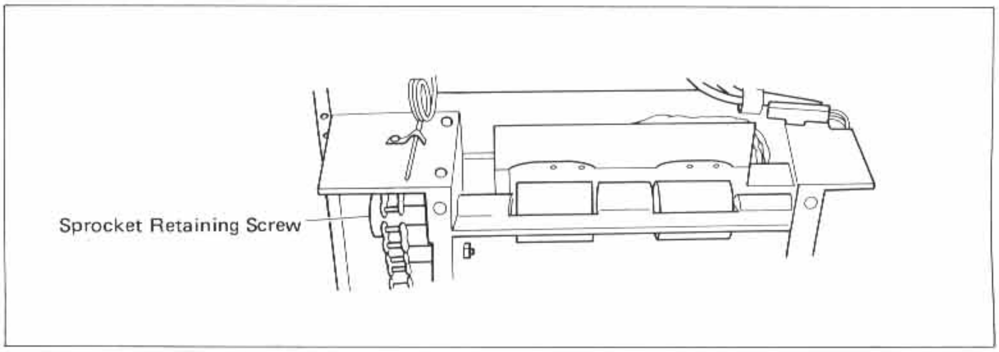




(3) Feed roller section

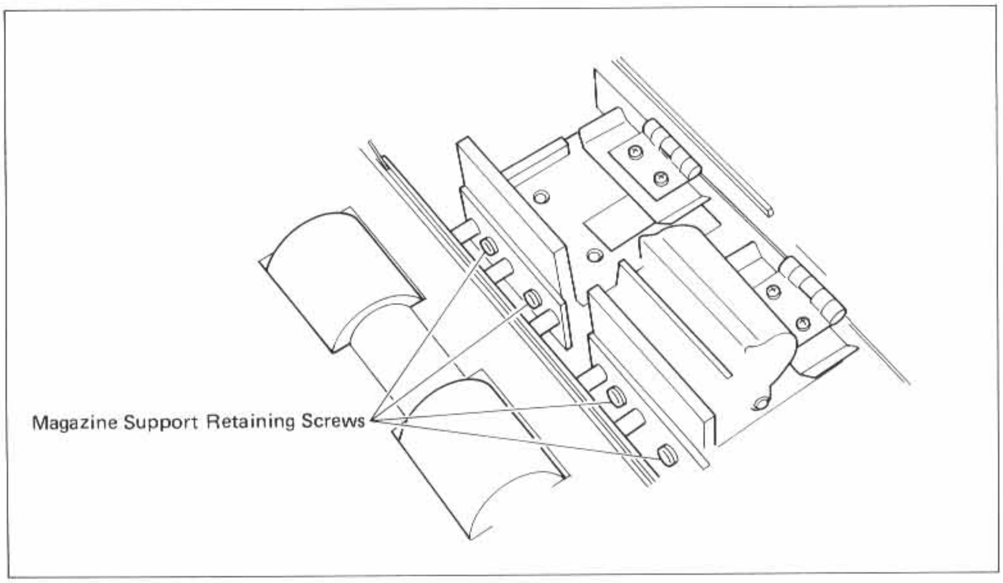
1. Feed roller retaining screws
2. Feed roller shaft sprocket retaining screw





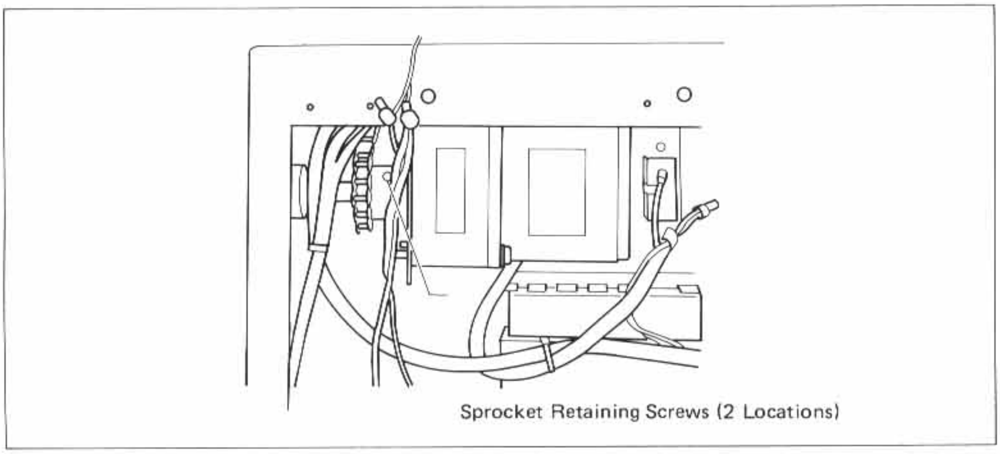
(4) Magazine movable section

- Magazine support retaining screws



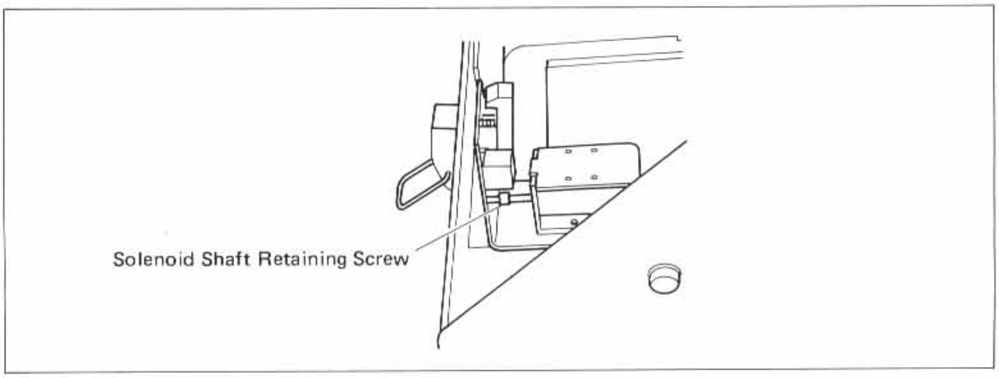
(5) Drive motor section

- Drive motor sprocket retaining screws



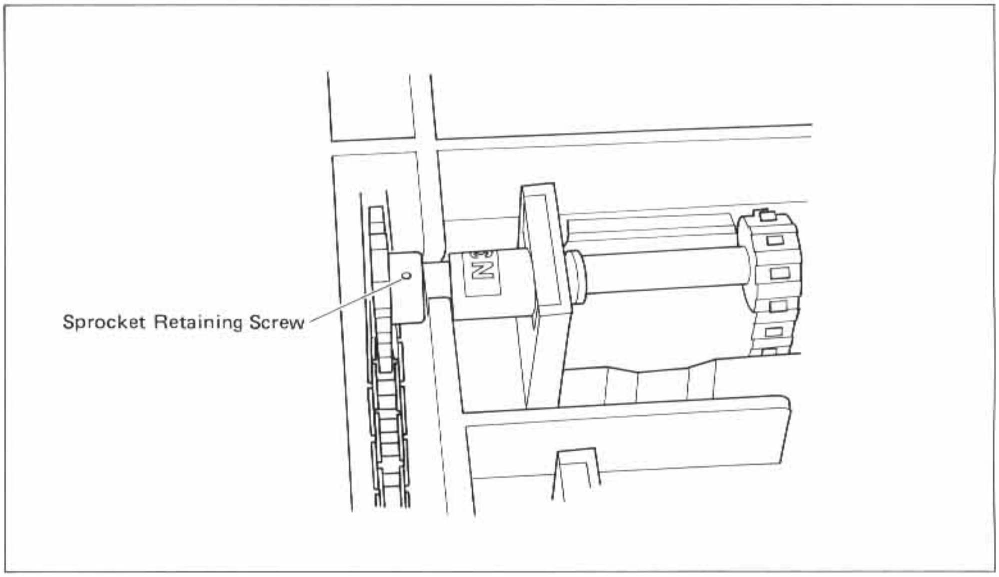
(6) Automatic lock section

- Solenoid shaft retaining screw



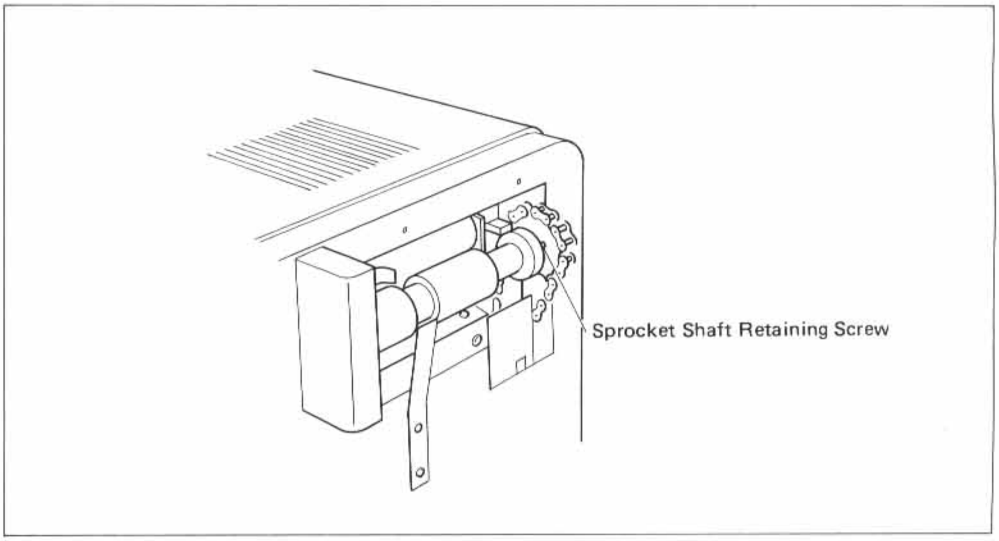
2. Processing section

Processing rack (NQ1 to dryer) sprocket retaining screws



3. Dryer section

Exit roller sprocket retaining screw



5.31 Circuit Board Replacement

For purposes of circuit board replacement carry out checks and replacements according to the following orientations.

5.31.1 CPH Circuit Board

1. Ensure that the jumped plug is ON.
2. Check the DIP switch settings.

	Waterless-Wash	Water-Wash
DIP SW1	OFF	ON

	FP350	FP350AL
DIP SW2	OFF	ON

CAUTION: ON and OFF repositioning of the DIP switches should take place ONLY with the POWER switch OFF.

3. Data Reestablishment
   Reset the replenishment counter (See section 6.6.) and then perform the following data setup.
   1 Temperatures NQ1 to NQ4, Dry
   2 Replenishment Amounts NQR1 to NQR4 See section 6.6.
   3 Pump Output Amounts NQ1 to NQ4
4. Temperature Calibration
   1 Immediately after circuit board replacement carry out temperature calibration (MODE 5 SUB and 5).
   2 Provide temperature adjustments and once again make calibrations when processing conditions have been reestablished.
   3 After a period of ten minutes make temperature adjustments again. If the temperature abnormality alarm should be generated during the outlined procedures, carry out calibrations again for more than three adjustment sequences.
   The procedures 2 and 3 above should be carried out alternately.
5. Output Voltage Checks

1	+5V	Limits +5V ± 0.1V	Check CPH Circuit Board TP1 to TP2
2	+12V	Limits +12V ± 0.1V	Check CPH Circuit Board TP3 to TP4
3	+6V	Limits +6V ± 0.25V	Check CPH Circuit Board TP5 to TP6

In relation to 1 and 2 above, if voltages are not within the designated limits, adjustments can be made from the PWH circuit board.
Adjustment of 3 above is not possible.

5.31.2 PWH Circuit Board

1. Ensure that switch S4 is ON.
2. Check the CPH circuit board TP for +5V and +12V limits.
   If these voltage limits are exceeded, make adjustments.

5.31.3 ALH Circuit Board

- Check the circuit board for an output voltage of +5V with upper and lower limits of plus and minus 0.2V. This check is made between terminal points TP10 and TP11 on the ALH circuit board.

6. MAINTENANCE MODE

The maintenance mode is used to effect test mode (mode 6) operations and forced drive.

1. Recall the maintenance mode by pressing the keys as follows.

   [MODE][0][SUB][9]

   NOTE: The [YES] key activation in the [MODE] [0] [SUB] [9] maintenance mode 1 – 4 designation procedures must take place within two seconds. If this time limit is exceeded the system will not respond.

2. The display then shows:

```
Maintenance Mode
1-9                0?
```

No.	Contents	Reference Section
1	Test mode ([MODE] [6])	6.1 to 6.4
2	Forced standby (forced drive)	6.5
3	Forced standby clearing	6.5
4	Reset the replenishment counter	6.6
5		
6		
7		
8		
9		

3. Specify the maintenance mode number.

   Example) When the [I] and [YES] keys are pressed in sequence, the following test mode (mode 6) is selectable.

Submode	Contents	Reference Section
6-1	Cutter test	6.1
6-2	Drive motor test	6.2
6-3	Dryer fan test	6.3
6-4	I/O check	6.4

NOTE: Mode 6 can be recalled only in the maintenance mode.
For test mode selection purposes key in as follows.
[MODE] [0] [SUB] [9] (Maintenance Mode designation.)
[I] [YES] (Hidden Mode release.)
[MODE] [6] (Test Mode designation.)

6.1 Cutter Test ([MODE] [6] [SUB] [I])

The cutter test mode is employed to provide film trailing end cutter operational checkouts. In this mode, the following operational checks are performed.

Right strand	Cutter solenoid SOL1/film cut detection sensor S5
Left strand	Cutter solenoid SOL2/film cut detection sensor S6

1. Select mode 6-1 by pressing the keys as follows.
   MODE 6 SUB 1
   The display then shows:

```
6-1 Cutter Test
                    Y/N
```

2. Press the YES key.
   The display then shows:

```
Cutter 1: Right
       2: Left       0?
```

3. Select the cutter blade to be operated, as indicated in the example below.
   Example) To operate the right-strand cutter, press the 1 and YES keys in sequence. The right-strand cutter blade then operates for 0.5 second.
   NOTE: To operate the left-strand cutter blade, press the 2 and YES keys in sequence.
4. After completion of the test, press the MODE and 0 keys in sequence.

6.2 Drive Motor Test (MODE 6 SUB 2)

1. Select mode 6-2 by pressing the keys as follows.
   MODE 6 SUB 2
   NOTE: If the system is already in mode 6, press only the SUB and 2 keys in sequence.
   After the above indicated key-in procedures, the display shows:

```
6-2 Drive Motor Test
                    Y/N
```

2. Press the YES key.
   The display then shows:

```
Drive Motor Off
                      Y
```

3. Press the START switch.
   NOTE: Before START switch activation, make sure that processing and crossover racks are properly set.
   The display then changes as follows to drive the motor.

```
Drive Motor On
                      Y
```

4. To stop the drive system, press the STOP switch.
   Drive motor test is now completed.

6.3 Dryer Fan (FAN1) Test (MODE 6 SUB 3)

1. Select mode 6-3.
   The display then shows:

```
6-3 Dry Fan Test
                    Y/N
```

2. Press the YES key.
   The display then shows:

```
Dry Fan 0: Off
        1: On          0?
```

3. Press the 1 and YES keys in sequence to operate the fan.
4. To stop the fan, press the 0 and YES keys in sequence.
5. After completion of the test, press the MODE and 0 keys in sequence.

6.4 I/O Check (MODE 6 SUB 4)

The I/O check mode is used to check on the proper functioning of microswitches, sensors, pumps, and motors.

6.4.1 Input Port Check Mode

The input port check mode is used for port status examination after port number specification. Note that the port status varies with the sensor output and microswitch ON/OFF operations.

Example)

1. I/O Check Mode Selection
   - Press the keys as follows.
     MODE 6 SUB 4
     The display then shows:

```
6-4 I/O Check
                   Y/N
```

   - Press the YES key.

```
0: Out  1: In  Port
                     Y
```

2. Input Port Check Mode Selection and Port Number Specification
   - Press the 1 key to select the input port check mode.
     The display then shows:

```
0: Out  1: In  1  Port
                     Y
```

   - Enter the desired port number.
     For instance, when port number 17 is entered, the display shows:

```
0: Out  1: In  1  Port  17
                     Y
```

End the above port number entry by pressing the YES key.

3. Port Status Check
   - Note the following indication appearing on the display.

```
Input Port 17
Data 00000000            Y
```

NOTE 1: Data bits are numbered as follows.

```
Data   0 0 0 0 0 0 0 0
Bit    7 6 5 4 3 2 1 0
```

   - To check the film cut detection microswitch, observe the state of bit 2 (right strand) or 3 (left strand).
   - Slide the magazine to turn ON and OFF the right-strand film cut detection microswitch. When the bit state alternates between 1 and 0, the microswitch is considered normal.

```
Input Port 17
Data 00000000            Y
```

This bit state alternates between 1 (ON) and 0 (OFF).

NOTE 2: For detailed information on the input ports, refer to the I/O Check Input Port Table in section 6.4.2.

NOTE 3: To check the sensors, cover the sensors with paper or the like to shield them from light and check the associated port contents.

4. To check the other ports, press the YES key and repeat steps 1 through 3.

NOTE: The following port contents cannot be checked on the display.

Port No.	Bit	Contents
Port No. 18	4	A/D converter EOC signal
	5	Display blanking signal
	7	Held in reserve
Port No. 26	3–7	Held in reserve

6.4.2 I/O Check Input Port Table

Port No.	Bit	Contents
Input port Port No. 16	0	Spare
	1	Spare
	2	Spare
	3	Spare
	4	Spare
	5	Spare
	6	Spare
	7	Film feed section cover status; 1 = closed, 0 = open
Input port Port No. 17	0	DIP switch 1 (CPH); 1 = OFF, 0 = ON
	1	DIP switch 2 (CPH); 1 = OFF, 0 = ON
	2	Film cut detection, right-strand; 1 = ON, 0 = OFF
	3	Film cut detection, left-strand; 1 = ON, 0 = OFF
	4	Film detection, right-strand; 1 = film absent, 0 = film present
	5	Film perforation detection, right-strand; 1 = perforation absent, 0 = perforation present
	6	Film detection, left-strand; 1 = film absent, 0 = film present
	7	Film perforation detection, left-strand; 1 = perforation absent, 0 = perforation present
Input port Port No. 18	0	Processing cover status; 1 = closed, 0 = open
	1	POWER switch; 1 = ON, 0 = OFF
	2	START switch; 1 = ON, 0 = OFF
	3	STOP switch; 1 = ON, 0 = OFF
	4	A/D converter EOC signal
	5	Display blanking signal
	6	200 V power failure detection
	7	Held in reserve
Input port Port No. 26	0	Film trailing end pressure detection, right-strand; 1 = ON, 0 = OFF
	1	Film trailing end pressure detection, left-strand; 1 = ON, 0 = OFF
	2	Processing solution level; 1 = too low, 0 = normal
	3	Held in reserve
	4	Held in reserve
	5	Held in reserve
	6	Held in reserve
	7	Held in reserve
Input port Port No. 64	0	Leader throughput motor cam detection; 1 = ON, 0 = OFF
	1	Leader detection; 1 = ON, 0 = OFF
	2	Cassette detection; 1 = ON, 0 = OFF
	3	Light lock plate detection; 1 = ON, 0 = OFF
	4	Spare; Set to 1
	5	Spare; Set to 1
	6	Spare; Set to 1
	7	Spare; Set to 1

6.4.3 Output Port Check Mode

In this output port check mode, the devices such as the pumps and motors are driven after associated port number specification to check on normal functioning.

Example)

1. I/O Check Mode Selection
   - Press the following keys.
     `MODE` `6` `SUB` `4`
     The display then shows:

```
 6-4  I/O  Check
                         Y/N
```

   - Press the `YES` key.

```
 0: Out   1: In  Port
                           Y
```

2. Output Port Check Mode Selection and Port Number Specification
   - Press the `0` key to select the output port check mode.
     The display then shows:

```
 0: Out   1: In  0  Port
                           Y
```

   - Enter the desired port number.
     For instance, when port number 26 is entered, the display shows:

```
 0: Out   1: In  0  Port  26
                           Y
```

     End the above port number entry by pressing the `YES` key.

3. Port Status Check
   - Note the following indication appearing on the display.

```
 Output  Port  26
 Data  XXXXXXXX            Y
```

   - To drive the film trailing end pressure solenoid, enter 1 into bit 4 (right strand) or 5 (left strand). For detailed information on the output ports, see section 6.4.4.

     NOTE 1: To enter 1 into a certain bit, key in the bit number using the appropriate numeric key. When the numeric key is pressed repeatedly, the bit state toggles between 1 and 0 as shown below.

     Example) Entering 1 into Bit 4
     When the `4` key is pressed once, the 1 state is entered as follows.

     00010000

     When the same key is pressed again, the 0 state is entered as follows.

     00000000

- When the film trailing end pressure solenoid is normal, [YES] key activation causes the right-strand film trailing end pressure solenoid to go ON.

  NOTE 2: Outputs are delivered to drives the devices only while the [YES] key is pressed.

  NOTE 3: When performing heater checkout, do not press the [YES] key for prolonged periods of time. Also be sure that solution heater checkout is not conducted when the associated processing tank solution level is too low.

4 To check the other ports, repeat steps 1 through 3.

  NOTE 4: The following port contents cannot be checked in the output port check mode.

Port No.	Bit	Contents
20	7	200 V power ON/OFF
24	0	Interrupt F/F reset
	7	200 VAC power ON
26	0–3	Held in reserve

6.4.4 I/O Test Output Port Table

Port No.	Bit	Contents
Output port Port No. 20	0	NQ1 solution heater; 1 = ON, 0 = OFF
	1	NQ2 solution heater; 1 = ON, 0 = OFF
	2	NQ3 solution heater; 1 = ON, 0 = OFF
	3	NQS solution heater; 1 = ON, 0 = OFF
	4	NQ4 solution heater; 1 = ON, 0 = OFF
	5	Dryer heater; 1 = ON, 0 = OFF
	6	Drive motor; 1 = ON, 0 = OFF
	7	200 V power ON/OFF; 1 = ON, 0 = OFF
Output port Port No. 21	0	Dryer fan; 1 = ON, 0 = OFF
	1	Output enable; 1 = disable, 0 = enable
	2	Cutter solenoid, right-strand; 1 = ON, 0 = OFF
	3	Cutter solenoid, left-strand; 1 = ON, 0 = OFF
	4	NQ1 replenishment pump; 1 = ON, 0 = OFF
	5	NQ2 replenishment pump; 1 = ON, 0 = OFF
	6	NQ3 replenishment pump; 1 = ON, 0 = OFF
	7	NQS replenishment pump; 1 = ON, 0 = OFF
Output port Port No. 24	0	Interrupt F/F reset; 1 = reset
	1	Drive motor; 1 = ON, 0 = OFF
	2	AC input ON
	3	Buzzer; 1 = ON, 0 = OFF
	4	Replenisher tank solution level check electrode; 1 = ON, 0 = OFF
	5	Replenishment start lamp; 1 = ON, 0 = OFF
	6	NQ4 replenishment pump; 1 = ON, 0 = OFF
	7	200 VAC power ON
Output port Port No. 26	0	Held in reserve
	1	Held in reserve
	2	Held in reserve
	3	Held in reserve
	4	Film trailing end pressure solenoid, right-strand; 1 = ON, 0 = OFF
	5	Film trailing end pressure solenoid, left-strand; 1 = ON, 0 = OFF
	6	Automatic lock; 1 = ON, 0 = OFF
	7	Circulation pump
Output port Port No. 64	0	Leader throughput motor drive; 1 = ON, 0 = OFF
	1	Spare
	2	Spare
	3	Spare
	4	Spare
	5	Spare
	6	Spare
	7	Spare

6.5 Forced Drive

Forced drive can be effected even when the preset processing solution temperatures are not reached.

Film processing can be performed in this forced drive mode. However, this mode should not be employed when an alarm condition or heater trouble exists.

NOTE: Film counting is not provided in the forced drive mode.

1. Select the maintenance mode.
   The display then shows:

```
Maintenance  Mode
1-9                      0?
```

2. Press the [2] [YES] keys.
   The display then shows as follows with the forced standby mark "#" blinking.

```
Heatup  State              #
NQ1: 28.3°C
```

3. Press the START switch to activate the drive system.
4. Press the STOP switch to deactivate the drive system.
5. Clear the forced standby state as indicated below.
   1) Select the maintenance mode.
   2) Press the [3] [YES] keys.

6.6 Replenishment Counter Reset

For equipment installation purposes or circuit board replacement and like procedures when the battery backup jumper plug is changed from OFF to ON, there is no way of telling what value remains in the counter memory. If the equipment is used without adjustment under these circumstances, replenishment defeat conditions will exist for extended periods of time (maximum of 18 hours).

In order to avoid these difficulties it is absolutely essential that the replenishment counter memory be returned to zero (0).

Therefore, for installation and circuit board replacement purposes it is essential that the following procedures be undertaken.

1. Designate the Maintenance Mode
   Key in [MODE] [0] [SUB] [9]
2. Designate the Replenishment Counter Reset Mode
   Key in [4] [YES]
3. Under these conditions carry out the procedures indicated under MODE 5 Condition Setup.
   NOTE: After completing the procedures indicated in 2. above, if the POWER is turned off the Replenishment Counter Reset Mode will be cleared.

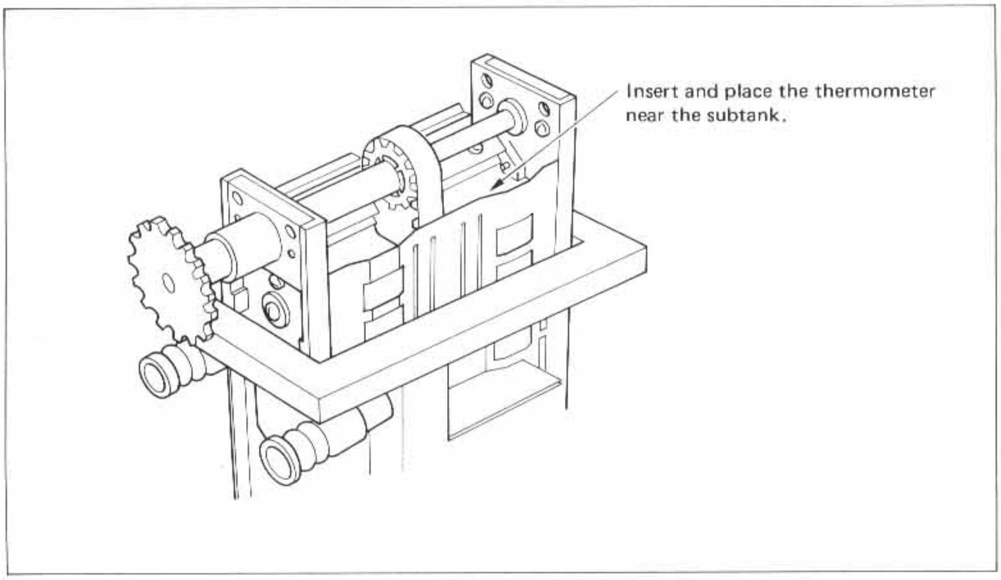
7. CIRCUIT BOARD ADJUSTMENT

7.1 Temperature Indication Calibration

Check whether the measured processing solution and dryer temperatures agree with the indicated temperatures, and effect calibration as required.

7.1.1 Processing Solution Temperature Measurement (MODE 5 SUB 2)

1. Before making temperature measurements, ensure that the preset temperatures are reached.
2. Have on hand a thermometer that accurately reads to one decimal place over a temperature range of 30 to 40°C (86 to 104°F).
3. Remove the crossover racks as required and insert the thermometer into the processing rack for temperature measurement. (Note the arrow in the figure below.)



Insert and place the thermometer near the subtank.

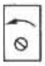
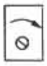
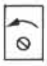
7.1.2 Temperature indication Calibration (MODE 5 SUB 5)

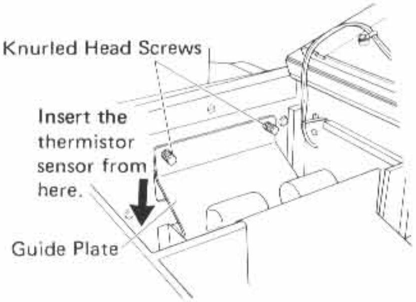
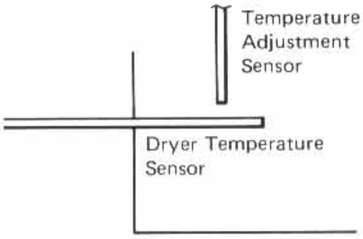
1. Use control circuit board (CPH) trimmers VR1 through VR8 (excluding VR2) for temperature indication calibration.
   Trimmer Locations (CPH Circuit Board)

VR8 ⊘	(For dryer)
VR7 ⊘	(For NQ4)
VR6 ⊘	(For NQS2)
VR5 ⊘	(For NQS1)
VR4 ⊘	(For NQ3)
VR3 ⊘	(For NQ2)
VR2 ⊘	(Not used)
VR1 ⊘	(For NQ1)

2. Perform the following steps to effect temperature indication calibration.

Step	Procedure	Display Indication
1. Temperature calibration submode selection	Press the keys as follows. [MODE] [5] [SUB] [5] **NOTE:** This submode is used only for temperature indication calibration and therefore not to be used otherwise.	5-5 Temp Calibration Y
2. Temperature calibration	Press the [YES] key.	Indicated Temperature NQ1 T Temp 39.4°C Y
(1) NQ1 temperature calibration	1. Measure the NQ1 solution temperature and compare it against the indication. If they do not match, turn trimmer VR1 until the indication agrees with the measured value. **NOTE:** Turning the trimmer clockwise increases the indication, and vice versa. 2. After adjustments, press the [YES] key and proceed to the next step. 3. Press the [YES] key to proceed to the next step. (This page is not used and therefore should be skipped.)	NQ1 T Temp 38.0°C Y (Measured temperature: 38.0°C) VR1 NQ1 S Temp °C Y
(2) NQ2 temperature calibration	1. Measure the NQ2 solution temperature and compare it against the indicated temperature. If they do not match, turn trimmer VR3 until the indication agrees with the measured value. 2. After adjustments, press the [YES] key and proceed to the next step.	NQ2 Temp 36.5°C Y (Measured temperature: 37°C) VR3 NQ1 Temp 37.0°C Y

Step	Procedure	Display Indication
(3) NQ3 temperature calibration	1. Measure the NQ3 solution temperature and compare it against the indicated temperature. If they do not match, turn trimmer VR4 until the indication agrees with the measured value. 2. After adjustments, press the YES key and proceed to the next step.	**NQ3 Temp 37.5°C** **Y** (Measured temperature: 37.0°C) VR4  **NQ3 Temp 37.0°C** **Y**
(4) NQS1 temperature calibration	1. Measure the NQS1 solution temperature and compare it against the indicated temperature. If they do not match, turn trimmer VR5 until the indication agrees with the measured value. 2. After adjustments, press the YES key and proceed to the next step.	**NQS1 Temp 34.5°C** **Y** (Measured temperature: 35.0°C) VR5  **NQS1 Temp 35.0°C** **Y**
(5) NQS2 temperature calibration	1. Measure the NQS2 solution temperature and compare it against the indicated temperature. If they do not match, turn trimmer VR6 until the indication agrees with the measured value. 2. After adjustments, press the YES key and proceed to the next step.	**NQS2 Temp 35.0°C** **Y** (Measured temperature: 35.0°C) VR6 In the above case, no adjustment is needed.
(6) NQ4 temperature calibration	1. Measure the NQ4 solution temperature and compare it against the indicated temperature. If they do not match, turn trimmer VR7 until the indication agrees with the measured value. 2. After adjustments, press the YES key and proceed to the next step.	**NQ4 Temp 37.2°C** **Y** (Measured temperature: 37.0°C) VR7  **NQ4 Temp 37.0°C** **Y**

Step	Procedure	Display Indication
(7) Dryer temperature calibration	1. After turning the START switch ON wait for five minutes. 2. Open the processing cover and as indicated in the figure below insert a thermistor type temperature sensor into the upper portion of the dryer sensor section.  Knurled Head Screws Insert the thermistor sensor from here. Guide Plate  Bring the temperature adjustment sensor to a position close to the end of the dryer temperature sensor. If the temperature adjustment sensor is inserted too far, electrical shock may result. It is essential that the illustrated configuration be established. 3. Close the processing section cover.	
	4. If there is a difference between the displayed and measured temperatures, using VR8 adjust the displayed temperature to match the measured temperature. **NOTE:** The dryer section temperature varies by about 2 degrees centigrade requiring that the central value be selected for adjustment purposes. 5. After adjustments have been made press the YES key. (The display will return to MODE 0.)	Dry Temp 52.3°C Y VR8 (Make several fine adjustments.)

7.2 Sensor Output Check

The following sensor outputs can be checked through the CPH circuit board.

Sensor	Reference Section
Replenisher tank solution level sensor	7.2.1, 7.2.2
Film detection sensor (LSE1/RSE1)	7.2.3
Film perforation sensor (LSE2/RSE2)	7.2.3

7.2.1 Replenisher Tank Solution Level Sensor Electrode Output

1. Set I/O check output port 24 bit 4 to 1. (See sections 6.4.3 and 6.4.4.) This causes the CPH circuit board 3/5 LBLON signal to go high (H level) only while the YES key is being pressed.
2. With the above state maintained, measure voltages between the +12 V GND terminal (Check terminal TP6.) and connector CN4 pins 1A, 2A, 3A, 4A, and 5A.
3. When the measured voltages are all +12 V, normal voltages are applied to all sensor electrodes.

Solution Level Sensor	Measurement Point	Measured Voltage
NQ1-R	Between Pin 1A and TP6 (GND)	+12 V
NQ2-R	Between Pin 2A and TP6 (GND)	+12 V
NQ3-R	Between Pin 3A and TP6 (GND)	+12 V
NQS-R	Between Pin 4A and TP6 (GND)	+12 V
NQ4-R	Between Pin 5A and TP6 (GND)	+12 V

7.2.2 Replenisher Tank Solution Level Sensor Output

1. Measure the U47 (CPH circuit board 3/5) output with the replenisher tank charged with the solution.

Solution Level Sensor	Measurement Point	Output
NQ1-R	Between U47-5 and GND (U47-9)	7.28 V or more
NQ2-R	Between U47-7 and GND (U47-9)	7.28 V or more
NQ3-R	Between U47-17 and GND (U47-9)	7.28 V or more
NQS-R	Between U47-11 and GND (U47-9)	4.71 V or more
NQ4-R	Between U47-19 and GND (U47-9)	3.88 V or more

2. When the solution level is normal, the U47 output is as specified above and U5 (CPH circuit board 3/5) pins 1, 2, 3, 4, and 40 go high (H level).

7.2.3 Film Detection/Film Perforation Sensor Output

(1) The standard sensor outputs are as follows.

Sensor	Check Point	Film Absent	Film Present
Right-strand film detection sensor (RSE1)	Between U36-7 and GND	1.2 V or lower	1.3 V or higher
Right-strand film perforation sensor (RSE2)	Between U36-9 and GND	1.2 V or lower	1.3 V or higher
Left-strand film detection sensor (LSE1)	Between U36-5 and GND	1.2 V or lower	1.3 V or higher
Left-strand film perforation sensor (LSE2)	Between U36-11 and GND	1.2 V or lower	1.3 V or higher

NOTE: The actual output is about 0.8 V when film is absent and 3 V or more when film is present.

(2) Red LED Output

Diode	Check Point	Normal	Abnormal
Right-strand red LED	Between CN16-1 and GND	A little under 3 V	5 V
Left-strand red LED	Between CH16-3 and GND	A little under 3 V	5 V

(3) Film Presence or Absence Determination Level
1.24 V for pins U36-6, 8, 4, and 10. (With CPH circuit board types 113G0306 and after, the voltage has been changed to 1.8 V.)

7.3 Switch Outputs

The signal levels of the microswitches and other switches are indicated below.

Switch	Check Point	Signal
POWER	Between CN6-1 and GND	L level
START	Between CN6-3 and GND	L level
STOP	Between CN6-5 and GND	L level

Switch	Check Point	Signal
POWER	Between U5-15 and GND	H level
START	Between U5-16 and GND	H level
STOP	Between U5-17 and GND	H level

7.4 Weekly Timer IC (U9) Output

Perform the following check when the weekly timer turns ON.

Check Point	Signal Status
Between U9-15 and GND	1. L level prevails for the first one minute only. 2. Afterwards, the signal input is produced by the ACSW signal.

8. ELECTRICAL PARTS LISTS

8.1 Control Circuit Board (CPH) Parts List

Symbol	Name	Remarks
BT	Backup battery (5 V)	NSB-3
Bz	Alarm	RMB-12
C0	Bypass capacitor (laminated ceramic), 0.1 μ	D55Y5V1H1104Z51
C1, C3, C40	Mylar capacitor	50 V, 0.1 μF
C5, C8–C15	Mylar capacitor	50 V, 0.01 μF
C24–C34	Mylar capacitor	
C37–C39	Mylar capacitor	
C2, C5	Aluminum electrolytic capacitor	16 VB 10
C35, C36	Aluminum electrolytic capacitor	16 VB 470
C41–C44	Aluminum electrolytic capacitor	16 VB 47
C6	Ceramic capacitor	DD104CH330J50V
C7	Ceramic capacitor	DD104CH100C50V
C16–C23	Tantalum (DIP) capacitor	16 V, 10 μ
CL	Noise limiter	CA92E-1C-IR000-R56
CN1	Connector, 30-pin	AXM230001
CN2	Connector, 4-pin	5273-04A
CN3, CN4	Connector, 16-pin	FCN-364P016AU
CN5	Connector, 12-pin	FCN-814P012A
CN6	Connector, 10-pin	FCN-814P010A
CN7	Connector, 8-pin	FCN-814P008A
CN8-1, -2, -3, -5	Connector, 2-pin; BRN, RED, ORG, GRN	5096-2C
CN8-4	Connector, 4-pin	5096-4C
CN9	Connector, 5-pin	5273-05A
CN10	Connector, 4-pin	5281-04A
CN11	Connector, 11-pin	5281-11A
CN12	Connector, 6-pin	5281-06A
CN13	Connector, 10-pin	5281-10A
CN14, CN16	Connector, 4-pin	FCN-814P004A
CN17	Connector, 9-pin	FCN-814P009A
CN18	Connector, 40-pin	AXM240001
D1	Zener diode	RD3.9E
D2–D10	Diode	1S1588
D11, D12	Diode	V06C
K5	Relay	G2R117P-V DC6V
L1	Coil	SF-T10-50S
R1, R10, R24, R32, R34	Carbon resistor	RD25S, 330 Ω
R2, R3, R6, R9, R14, R19, R20, R25–R27, R29–R31, R35, R37, R39, R41	Carbon resistor	RD25S, 4.7 kΩ
R4	Carbon resistor	RD25S, 100 Ω
R5, R15, R23, R28	Carbon resistor	RD25S, 1 kΩ

Symbol	Name	Remarks
R7	Carbon resistor	RD25S, 36 Ω
R8, R18	Carbon resistor	RD25S, 10 kΩ
R11, R12, R13	Carbon resistor	RD25S, 100 kΩ
R21, R22	Carbon resistor	RD25S, 1.8 kΩ
R33	Carbon resistor	RD25S, 220 Ω
R36, R38, R40	Carbon resistor	RD25S, 2.2 kΩ
RA1, RA14	Resistor array, 4.7 kΩ, 8-device	PKC 1/8B-8-4.7 kΩJ
RA2, RA5, RA15, RA18	Resistor array, 4.7 kΩ, 4-device	PKC 1/8B-4-4.7 kΩJ
RA3	Resistor array, 1 kΩ, 8-device	PKC 1/8B-8-1 kΩJ
RA4	Resistor array, 47 kΩ, 8-device	PKC 1/8B-8-47 kΩJ
RA6	Resistor array, 47 kΩ, 4-device	PKC 1/8B-4-47 kΩJ
RA7	Resistor array, 100 kΩ, 4-device	PKC 1/8B-4-100 kΩJ
RA8, RA9	Resistor array, 10 kΩ, 4-device	PKC 1/8B-4S-10 kΩJ
RA10, 12	Resistor array, 1 kΩ, 4-device	PKC 1/8B-4-1 kΩJ
RA11, RA14, RA16, RA19	Resistor array, 51 kΩ, 4-device	PKC 1/8B-4S-51 kΩJ
RA13, RA20	Resistor array, 10 kΩ, 8-device	PKC 1/8B-4-10 kΩJ
RA17	Resistor array, 4.7 kΩ, 8-device	PKC 1/8B-8-4.7 kΩJ
SR1–SR3	Rectifier	1D4B41
SSR1, SSR3, SSR4	SSR, 200 V, 3 A	SW3DP-HI-4
SSR2, SSR5	SSR, 200 V, 2 A	SW2DP-HI-4
SSR6-SSR14, SSR16–SSR18	SSR, 100 V, 2 A	SW2DP-MI-4
SSR15	SSR, 100 V, 0.1 A	S11MD3
S1	DIP switch, 2-pin	DSS-102
TR1, TR3, TR5	Transistor	2SA1015
TR2, TR4, TR6	Transistor	2SC1815Y
TR7	Transistor	2SD669
TR8	Transistor	2SB649
TR9–TR11	Transistor	2SB673
TP1–TP6	Check pin	LC-2-G (WHT)
U1	CPU (Z-80A)	LH0080
U2	P-ROM (27256)	MBM 27256-25Z
U3	RAM	TC5516AP
U4	RAM	HM6116
U5–U7	PIO	μPD8225AC-5
U8	A/D converter	μPD7004C
U9	Timer IC	RP5C01
U10	Voltage detector	TL7705
U11	Frequency divider	8650-0
U12	TTL IC	74LS139
U13, 46	TTL IC	74LS32
U14	TTL IC	74LS74
U15	TTL IC	M53204 (74LS04)
U16	Crystal oscillator	EX02, 4 MHz
U17, U37	C-MOS	TC4093

Symbol	Name	Remarks
U18, U19	Bus driver	M5L8226P
U20, U21, U22	TTL IC	74LS157
U23, U24, U25, U31	TTL IC	74LS04
U26, U27	TTL IC	74LS138
U34, U35	TTL IC	74LS14
U36	Comparator	μPC339C
U38	TTL IC	M53216 (74LS16)
U39, U41	TTL IC	74LS38
U40, U42, U43	TTL IC	74LS26
U44	6 V regulator	HA178M06
U28, U29, U45	TTL IC	74LS541
U30	TTL IC	74LS645
U32	TTL IC	74LS540
U33	TTL IC	74LS640
U47	Hybrid IC	HT8511
U48	Hybrid IC	HT8520
U49	Hybrid IC	HT8530
VR1, VR8	Variable resistor	RJ9W, 5K
VR2–VR7	Variable resistor	RJ9W, 200
X1	Crystal oscillator	P-3, 32.768 kHz

8.2 Control Circuit Board (PWH) Parts List

Symbol	Name	Remarks
CR1–CR9	Surge absorber	XE1201
K1	Relay	HL-2, AC100V
K2	Relay	HG-2, AC100V
K3	Relay	H-OP, DC12V (AQ72041)
K4	Relay	HC-2, AC100V
K5	Relay	HC-2, AC200V
NF	Noise filter	ZMB2203-11
PU1	+5 V power supply	SSE05030
PU2	+12 V power supply	SSE121R3
S1	Switch	01-262
S4	Switch	M-2011P
Z1–Z3, Z5, Z6	Varistor	ENB461D-10A (for 200 to 240V)
Z4	Varistor	ENB251D-10A (for 100 V)

8.3 Automatic Loader Control Circuit Board (ALH) Parts List

Symbol	Name	Remarks
C0	Stepped Ceramic Capacitor	
C60, C64–C67	Film Capacitors	CQ92MB1H103K
C61	Variable Condenser	SM25VB47M
CL1–CL3	Noise Limiters	
CN60	Flat Connector	
CN61	Connector	
CN62	Connector	
CN63	Connector	
RA30	Resistor Network	
RA31	Resistor Network	
RA32	Resistor Network	
R60	Resistor	
SSR60	Relay	
TP10, 11	Check Pins	
U60	TTL IC	
U61	TTL IC	
U62	TTL IC	
U63, U68	TTL IC	
U64	TTL IC	
U65	TTL IC	
U66	TTL IC	
U67	TTL IC	
U69	TTL IC	

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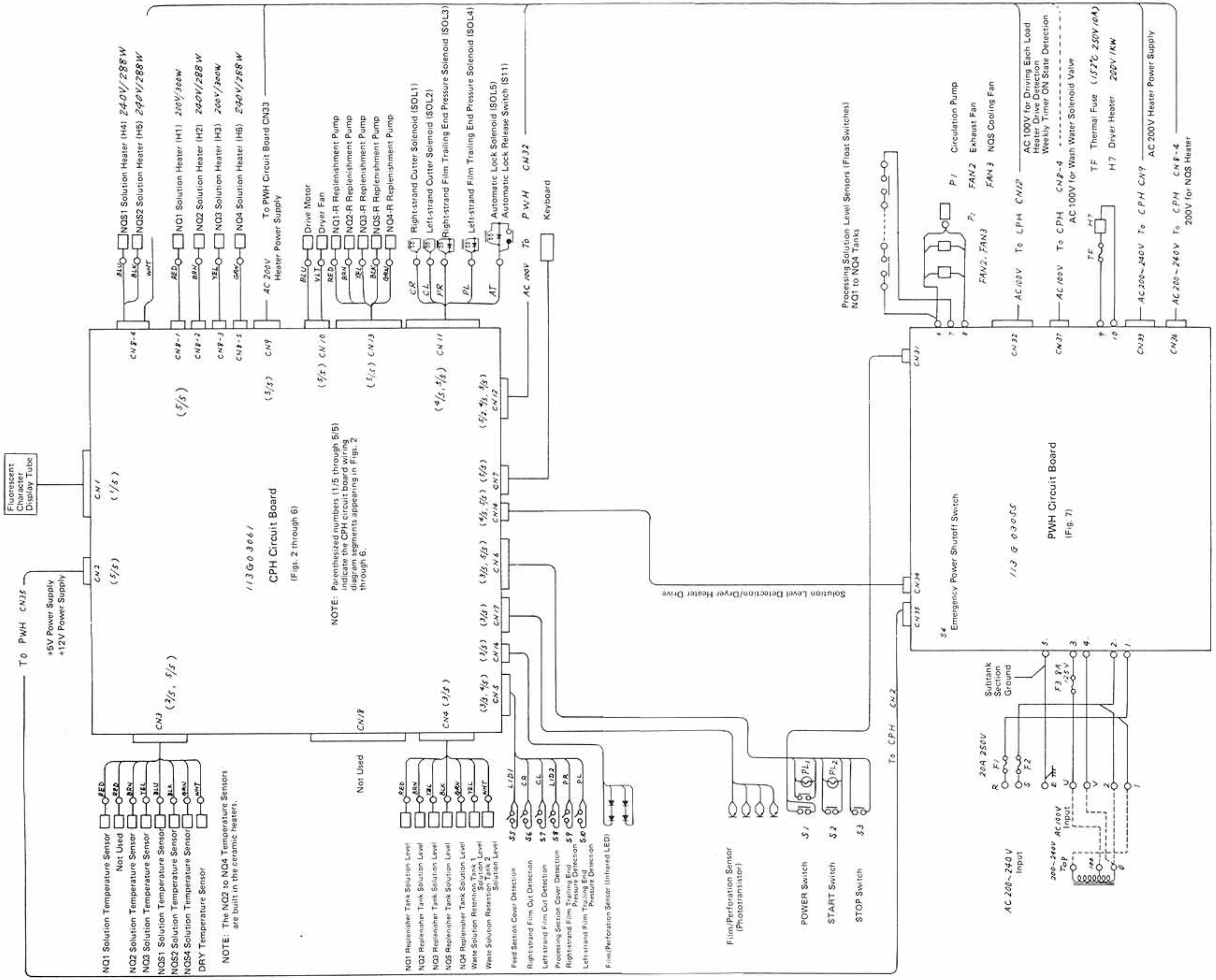
9. ELECTRICAL CIRCUIT DIAGRAMS

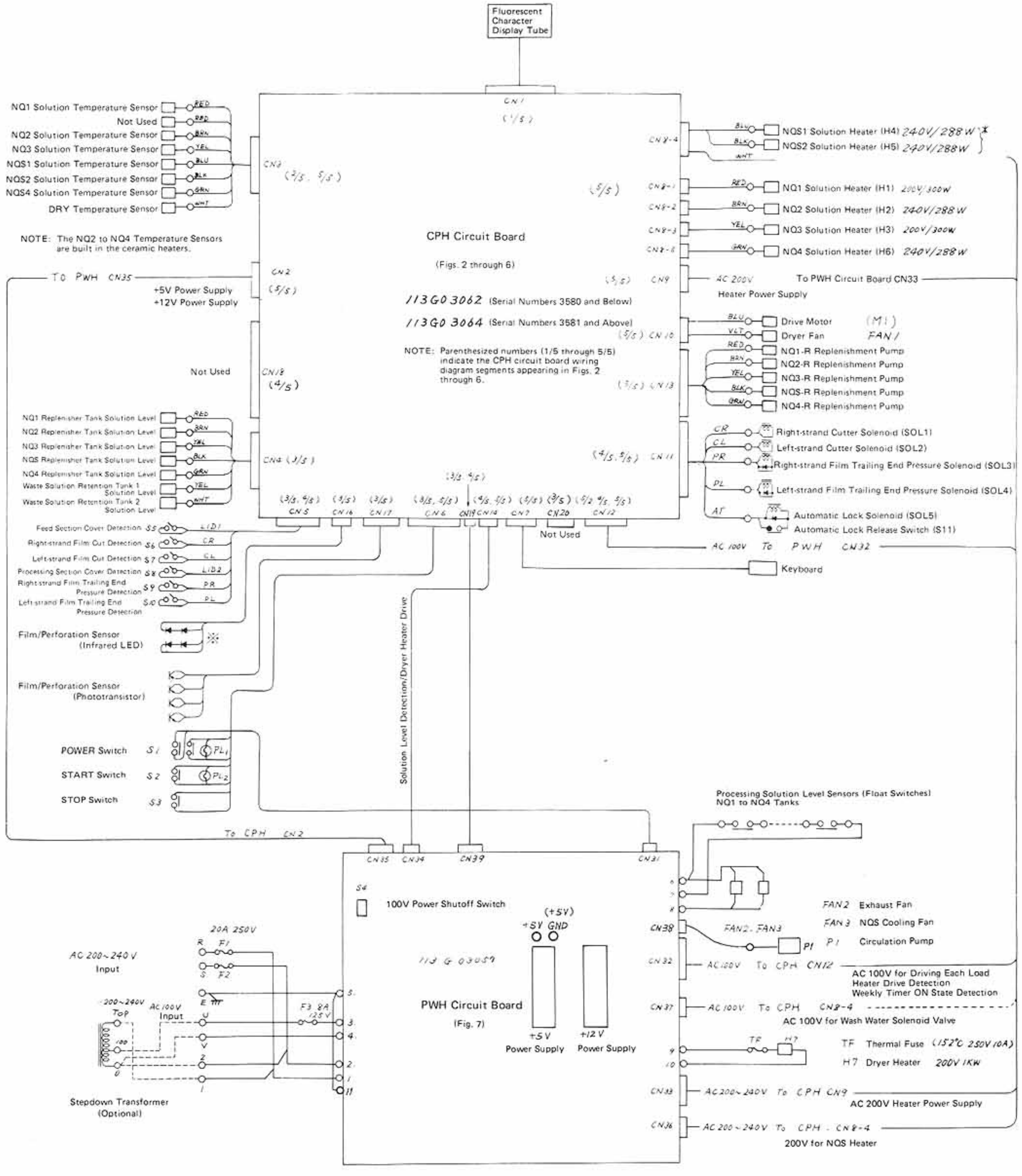
Fig. 1a FP350 GENERAL WIRING DIAGRAM (SERIAL NUMBERS 2600 AND BELOW)


NQS1 Solution Heater (H4) 240V/288W
NQS2 Solution Heater (H5) 240V/288W
NQ1 Solution Heater (H1) 200V/300W
NQ2 Solution Heater (H2) 240V/288W
NQ3 Solution Heater (H3) 200V/300W
NQ4 Solution Heater (H6) 240V/288W
To PWH Circuit Board CN33
AC 200V Heater Power Supply
Drive Motor
Dryer Fan
NQ1-R Replenishment Pump
NQ2-R Replenishment Pump
NQ3-R Replenishment Pump
NQS-R Replenishment Pump
NQ4-R Replenishment Pump
Right-strand Cutter Solenoid (SOL1)
Left-strand Cutter Solenoid (SOL2)
Right-strand Film Trailing End Pressure Solenoid (SOL3)
Left-strand Film Trailing End Pressure Solenoid (SOL4)
Automatic Lock Solenoid (SOL5)
Automatic Lock Release Switch (S11)
AC 100V To PWH CN32
Keyboard
BLU BLK WHT RED BRN YEL GRN VLT
CR CL PR PL AT
Fluorescent Character Display Tube
To PWH CN35
+5V Power Supply
+12V Power Supply
CN1 (1/5)
CN2 (5/5)
CN3 (2/5, 5/5)
CN8-4 CN8-1 CN8-2 CN8-3 CN8-5 (5/5)
CN9 (5/5)
CN10 (5/5)
CN13 (5/5)
CN11 (4/5, 5/5)
CN12 (5/2, 4/5, 5/5)
CN7 (5/5)
CN14 (4/5, 5/5)
CN6 (3/5, 5/5)
CN17 (3/5)
CN16 (3/5)
CN5 (3/5, 4/5)
CN4 (3/5)
CN18
113G03061
CPH Circuit Board
(Figs. 2 through 6)
NOTE: Parenthesized numbers (1/5 through 5/5) indicate the CPH circuit board wiring diagram segments appearing in Figs. 2 through 6.
NQ1 Solution Temperature Sensor
Not Used
NQ2 Solution Temperature Sensor
NQ3 Solution Temperature Sensor
NQS1 Solution Temperature Sensor
NQS2 Solution Temperature Sensor
NQS4 Solution Temperature Sensor
DRY Temperature Sensor
NOTE: The NQ2 to NQ4 Temperature Sensors are built in the ceramic heaters.
Not Used
NQ1 Replenisher Tank Solution Level
NQ2 Replenisher Tank Solution Level
NQ3 Replenisher Tank Solution Level
NQS Replenisher Tank Solution Level
NQ4 Replenisher Tank Solution Level
Waste Solution Retention Tank 1 Solution Level
Waste Solution Retention Tank 2 Solution Level
Feed Section Cover Detection
Right-strand Film Cut Detection
Left-strand Film Cut Detection
Processing Section Cover Detection
Right-strand Film Trailing End Pressure Detection
Left-strand Film Trailing End Pressure Detection
Film/Perforation Sensor (Infrared LED)
S5 S6 S7 S8 S9 S10
LID1 CR CL LID2 PR PL
Film/Perforation Sensor (Phototransistor)
POWER Switch S1
START Switch S2
STOP Switch S3
PL1 PL2
To CPH CN2
Solution Level Detection/Dryer Heater Drive
Processing Solution Level Sensors (Float Switches) NQ1 to NQ4 Tanks
P1 Circulation Pump
FAN2 Exhaust Fan
FAN3 NQS Cooling Fan
FAN2, FAN3
AC 100V To CPH CN12
AC 100V for Driving Each Load
Heater Drive Detection
Weekly Timer ON State Detection
AC 100V To CPH CN8-4
AC 100V for Wash Water Solenoid Valve
TF Thermal Fuse (152°C 250V 10A)
H7 Dryer Heater 200V 1KW
AC 200~240V To CPH CN9
AC 200V Heater Power Supply
AC 200~240V To CPH CN8-4
200V for NQS Heater
CN31 CN32 CN37 CN33 CN36 CN34 CN35
S4 Emergency Power Shutoff Switch
113G03055
PWH Circuit Board
(Fig. 7)
Subtank Section Ground
F3 3A 125V
20A 250V
R F1 S F2
E U V W
AC 200~240V Input
200~240V TOP 100 0
AC 100V Input

NOTE: All the above abbreviated color indications relate to the connectors.
The following abbreviations are employed.

Red: Red (NQ1 Connector Color)
BRN: Brown (NQ2 Connector Color)
YEL: Yellow (For NQ3 or Waste Solution Retention Tank 1)
BLU: Blue (For NQS1 or Drive Motor)
BLK: Black (NQS2 or NQS Connector Color)
GRN: Green (NQ4 Connector Color)
WHT: White (For DRY Temperature Sensor or Waste Solution Retention tank 2)
VLT: Violet (For Dryer Fan)

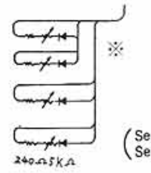
Fig. 1b FP350 GENERAL WIRING DIAGRAM (SERIAL NUMBERS 2601 AND ABOVE)


Fluorescent Character Display Tube
CN1 (1/5)
CPH Circuit Board
(Figs. 2 through 6)
113G0 3062 (Serial Numbers 3580 and Below)
113G0 3064 (Serial Numbers 3581 and Above)
NOTE: Parenthesized numbers (1/5 through 5/5) indicate the CPH circuit board wiring diagram segments appearing in Figs. 2 through 6.
NQ1 Solution Temperature Sensor RED
Not Used RED
NQ2 Solution Temperature Sensor BRN
NQ3 Solution Temperature Sensor YEL
NQS1 Solution Temperature Sensor BLU
NQS2 Solution Temperature Sensor BLK
NQS4 Solution Temperature Sensor GRN
DRY Temperature Sensor WHT
CN3 (2/5, 5/5)
NOTE: The NQ2 to NQ4 Temperature Sensors are built in the ceramic heaters.
TO PWH CN35
+5V Power Supply
+12V Power Supply
CN2 (5/5)
Not Used
CN18 (4/5)
NQ1 Replenisher Tank Solution Level RED
NQ2 Replenisher Tank Solution Level BRN
NQ3 Replenisher Tank Solution Level YEL
NQS Replenisher Tank Solution Level BLK
NQ4 Replenisher Tank Solution Level GRN
Waste Solution Retention Tank 1 Solution Level YEL
Waste Solution Retention Tank 2 Solution Level WHT
CN4 (3/5)
Feed Section Cover Detection S5 LID1
Right-strand Film Cut Detection S6 CR
Left-strand Film Cut Detection S7 CL
Processing Section Cover Detection S8 LID2
Right-strand Film Trailing End Pressure Detection S9 PR
Left-strand Film Trailing End Pressure Detection S10 PL
Film/Perforation Sensor (Infrared LED) ※
Film/Perforation Sensor (Phototransistor)
POWER Switch S1 PL1
START Switch S2 PL2
STOP Switch S3
(3/5, 4/5) CN5
(3/5) CN16
(3/5) CN17
(3/5, 5/5) CN6
(3/5, 4/5) CN19
(4/5, 5/5) CN14
(5/5) CN7
(3/5) CN20
(5/2 4/5, 5/5) CN12
Not Used
Solution Level Detection/Dryer Heater Drive
CN8-4
BLU NQS1 Solution Heater (H4) 240V/288W *
BLK NQS2 Solution Heater (H5) 240V/288W
WHT
(5/5)
CN8-1 RED NQ1 Solution Heater (H1) 200V/300W
CN8-2 BRN NQ2 Solution Heater (H2) 240V/288W
CN8-3 YEL NQ3 Solution Heater (H3) 200V/300W
CN8-5 GRN NQ4 Solution Heater (H6) 240V/288W
(5/5) CN9 AC 200V Heater Power Supply
To PWH Circuit Board CN33
(5/5) CN10
BLU Drive Motor (M1)
VLT Dryer Fan FAN1
(3/5) CN13
RED NQ1-R Replenishment Pump
BRN NQ2-R Replenishment Pump
YEL NQ3-R Replenishment Pump
BLK NQS-R Replenishment Pump
GRN NQ4-R Replenishment Pump
(4/5, 5/5) CN11
CR Right-strand Cutter Solenoid (SOL1)
CL Left-strand Cutter Solenoid (SOL2)
PR Right-strand Film Trailing End Pressure Solenoid (SOL3)
PL Left-strand Film Trailing End Pressure Solenoid (SOL4)
AT Automatic Lock Solenoid (SOL5)
Automatic Lock Release Switch (S11)
AC 100V To PWH CN32
Keyboard
To CPH CN2
CN35
CN34
CN39
CN31
S4
100V Power Shutoff Switch
(+5V)
+5V GND
113 G 03059
PWH Circuit Board
(Fig. 7)
+5V Power Supply
+12V Power Supply
Processing Solution Level Sensors (Float Switches) NQ1 to NQ4 Tanks
6
7
8
CN38
FAN2, FAN3
P1
FAN2 Exhaust Fan
FAN3 NQS Cooling Fan
P1 Circulation Pump
CN32 AC 100V To CPH CN12
AC 100V for Driving Each Load
Heater Drive Detection
Weekly Timer ON State Detection
CN37 AC 100V To CPH CN8-4
AC 100V for Wash Water Solenoid Valve
9
10
TF H7
TF Thermal Fuse (152°C 250V 10A)
H7 Dryer Heater 200V 1KW
CN33 AC 200~240V To CPH CN9
AC 200V Heater Power Supply
CN36 AC 200~240V To CPH - CN8-4
200V for NQS Heater
AC 200~240V Input
20A 250V
R F1
S F2
E
200~240V Top
AC 100V Input
100
0
U
V
Z
1
F3 8A 125V
5.
3.
4.
2.
1
11
Stepdown Transformer (Optional)

NOTE: All the above abbreviated color indications related to the connectors.
The following abbreviations are employed.

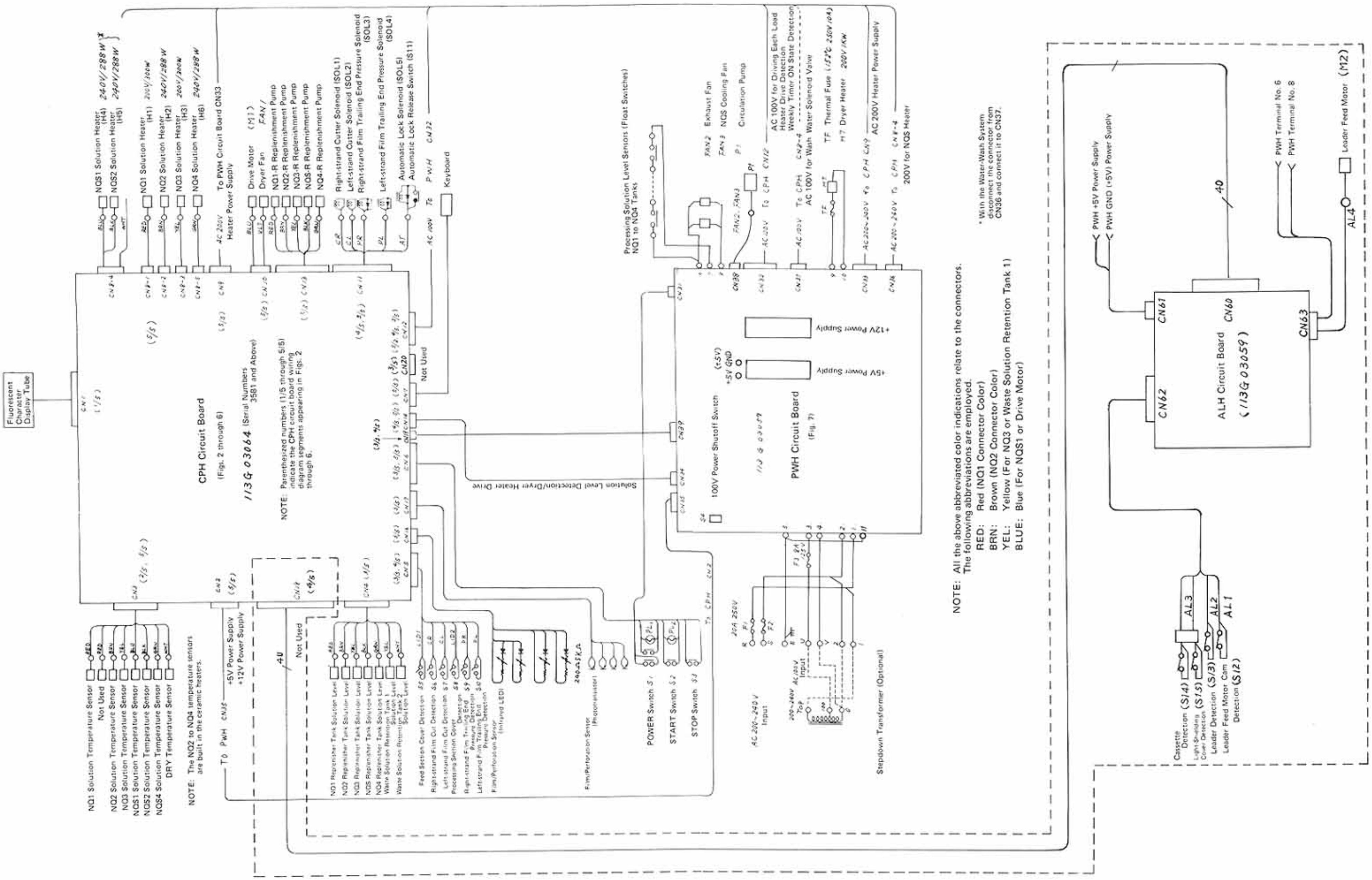
RED:	Red (NQ1 Connector Color)
BRN:	Brown (NQ2 Connector Color)
YEL:	Yellow (For NQ3 or Waste Solution Retention Tank 1)
BLU:	Blue (For NQS1 or Drive Motor)
BLK:	Black (NQS2 or NQS Connector Color)
GRN:	Green (NQ4 Connector Color)
WHT:	White (For DRY Temperature Sensor or Waste Solution Retention Tank 2)
VLT:	Violet (For Dryer Fan)

* With the Water-Wash System disconnect the connector from CN36 and connect it to CN37.



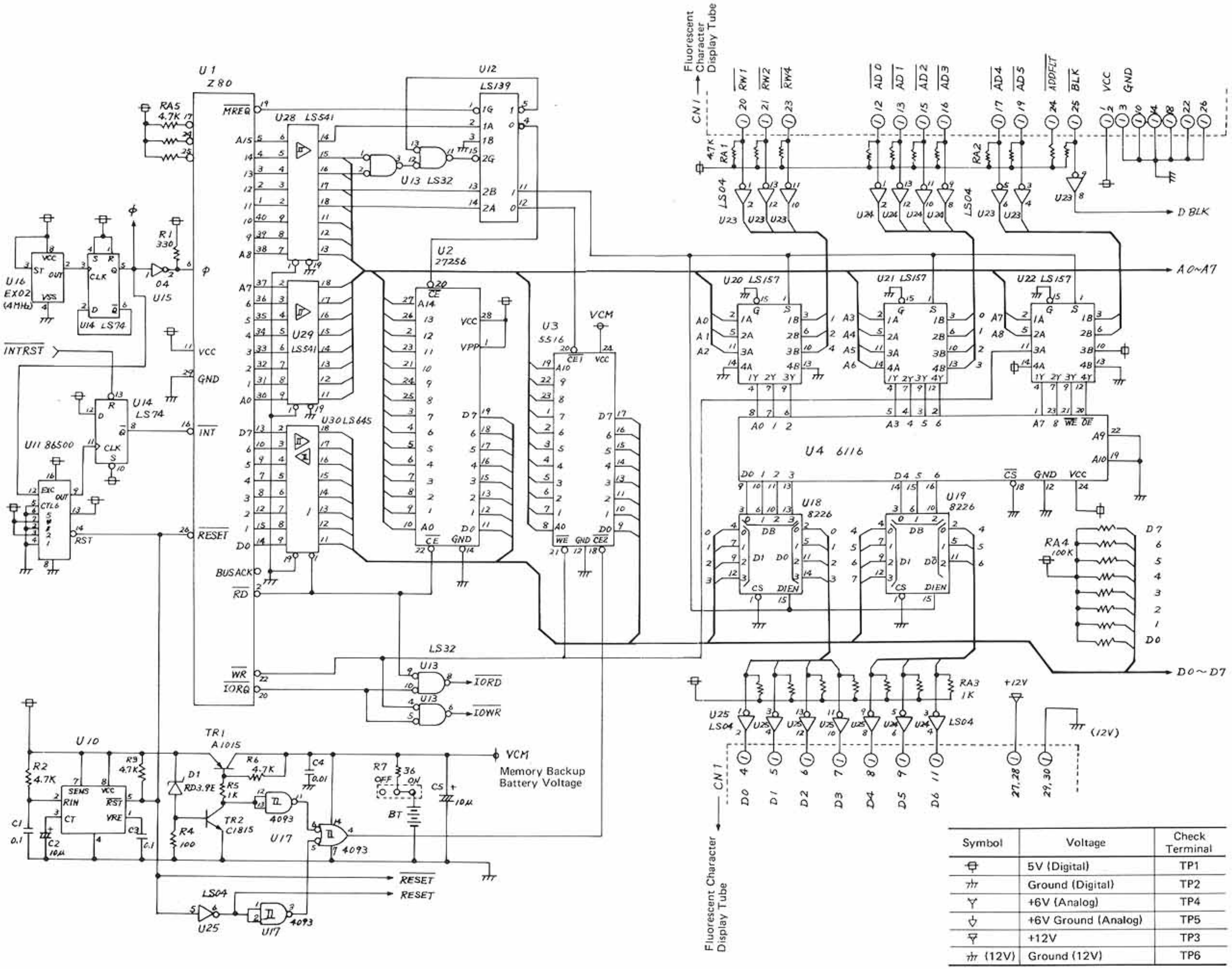
(Serial Numbers: 3431 to 3461
Serial Numbers: 3581 AND ABOVE)

Fig. 1c FP350AL GENERAL WIRING DIAGRAM (SERIAL NUMBERS 7001 AND ABOVE)



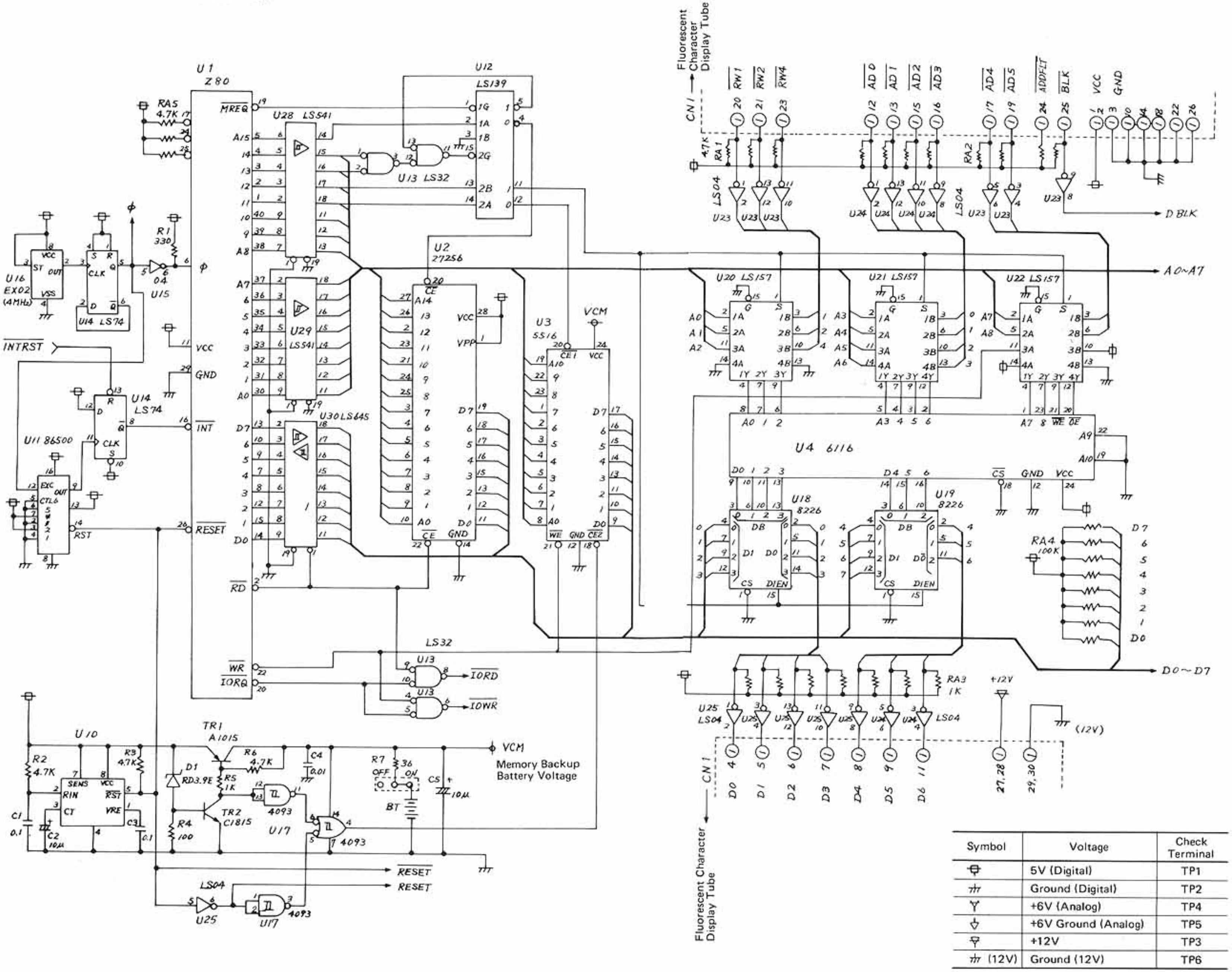
Fluorescent Character Display Tube
CPH Circuit Board
(Figs. 2 through 6)
113G 03064 (Serial Numbers 3581 and Above)
NOTE: Parenthesized numbers (1/5 through 5/5) indicate the CPH circuit board wiring diagram segments appearing in Figs. 2 through 6.
NQS1 Solution Heater (H4) 240V/288W
NQS2 Solution Heater (H5) 240V/288W
NQ1 Solution Heater (H1) 200V/300W
NQ2 Solution Heater (H2) 240V/288W
NQ3 Solution Heater (H3) 200V/300W
NQ4 Solution Heater (H6) 240V/288W
To PWH Circuit Board CN33
AC 200V Heater Power Supply
Drive Motor (M1)
Dryer Fan FAN1
NQ1-R Replenishment Pump
NQ2-R Replenishment Pump
NQ3-R Replenishment Pump
NQS-R Replenishment Pump
NQ4-R Replenishment Pump
Right-strand Cutter Solenoid (SOL1)
Left-strand Cutter Solenoid (SOL2)
Right-strand Film Trailing End Pressure Solenoid (SOL3)
Left-strand Film Trailing End Pressure Solenoid (SOL4)
Automatic Lock Solenoid (SOL5)
Automatic Lock Release Switch (S11)
AC 100V To PWH CN32
Keyboard
Not Used
Solution Level Detection/Dryer Heater Drive
NQ1 Solution Temperature Sensor
Not Used
NQ2 Solution Temperature Sensor
NQ3 Solution Temperature Sensor
NQS1 Solution Temperature Sensor
NQS2 Solution Temperature Sensor
NQ4 Solution Temperature Sensor
DRY Temperature Sensor
NOTE: The NQ2 to NQ4 temperature sensors are built in the ceramic heaters.
To PWH CN35
+5V Power Supply
+12V Power Supply
Not Used
NQ1 Replenisher Tank Solution Level
NQ2 Replenisher Tank Solution Level
NQ3 Replenisher Tank Solution Level
NQS Replenisher Tank Solution Level
NQ4 Replenisher Tank Solution Level
Waste Solution Retention Tank 1 Solution Level
Water Solution Retention Tank 2 Solution Level
Feed Section Cover Detection S5
Right-strand Film Cut Detection S6
Left-strand Film Cut Detection S7
Processing Section Cover Detection S8
Right-strand Film Trailing End Pressure Detection S9
Left-strand Film Trailing End Pressure Detection S10
Film/Perforation Sensor (Infrared LED)
Film/Perforation Sensor (Phototransistor)
POWER Switch S1
START Switch S2
STOP Switch S3
To CPH CN2
Processing Solution Level Sensors (Float Switches) NQ1 to NQ4 Tanks
FAN2 Exhaust Fan
FAN3 NQS Cooling Fan
P1 Circulation Pump
AC 100V for Driving Each Load Heater Drive Detection Weekly Timer ON State Detection
To CPH CN12
To CPH CN8-4
AC 100V for Wash Water Solenoid Valve
TF Thermal Fuse (152°C 250V 10A)
H7 Dryer Heater 200V 1KW
AC 200V Heater Power Supply
To CPH CN9
To CPH CN8-4
200V for NQS Heater
+12V Power Supply
+5V Power Supply
(+5V) +5V GND
100V Power Shutoff Switch
113G 03059
PWH Circuit Board
(Fig. 7)
AC 200~240V Input
AC 200V Input
200~240V Tap
20A 250V
F1 F2
Stepdown Transformer (Optional)
NOTE: All the above abbreviated color indications relate to the connectors. The following abbreviations are employed.
RED: Red (NQ1 Connector Color)
BRN: Brown (NQ2 Connector Color)
YEL: Yellow (For NQ3 or Waste Solution Retention Tank 1)
BLUE: Blue (For NQS1 or Drive Motor)
* With the Water-Wash System disconnect the connector from CN36 and connect it to CN37.
PWH +5V Power Supply
PWH GND (+5V) Power Supply
PWH Terminal No. 6
PWH Terminal No. 8
Leader Feed Motor (M2)
AL4
CN61
CN60
CN63
CN62
ALH Circuit Board
(113G 03059)
AL3
AL2
AL1
Cassette Detection (S14)
Light-Shielding Cover Detection (S15)
Leader Detection (S13)
Leader Feed Motor Cam Detection (S12)
40

Fig. 2a FP350 CPH CIRCUIT BOARD WIRING DIAGRAM 1/5 (SERIAL NUMBERS 2600 AND BELOW)



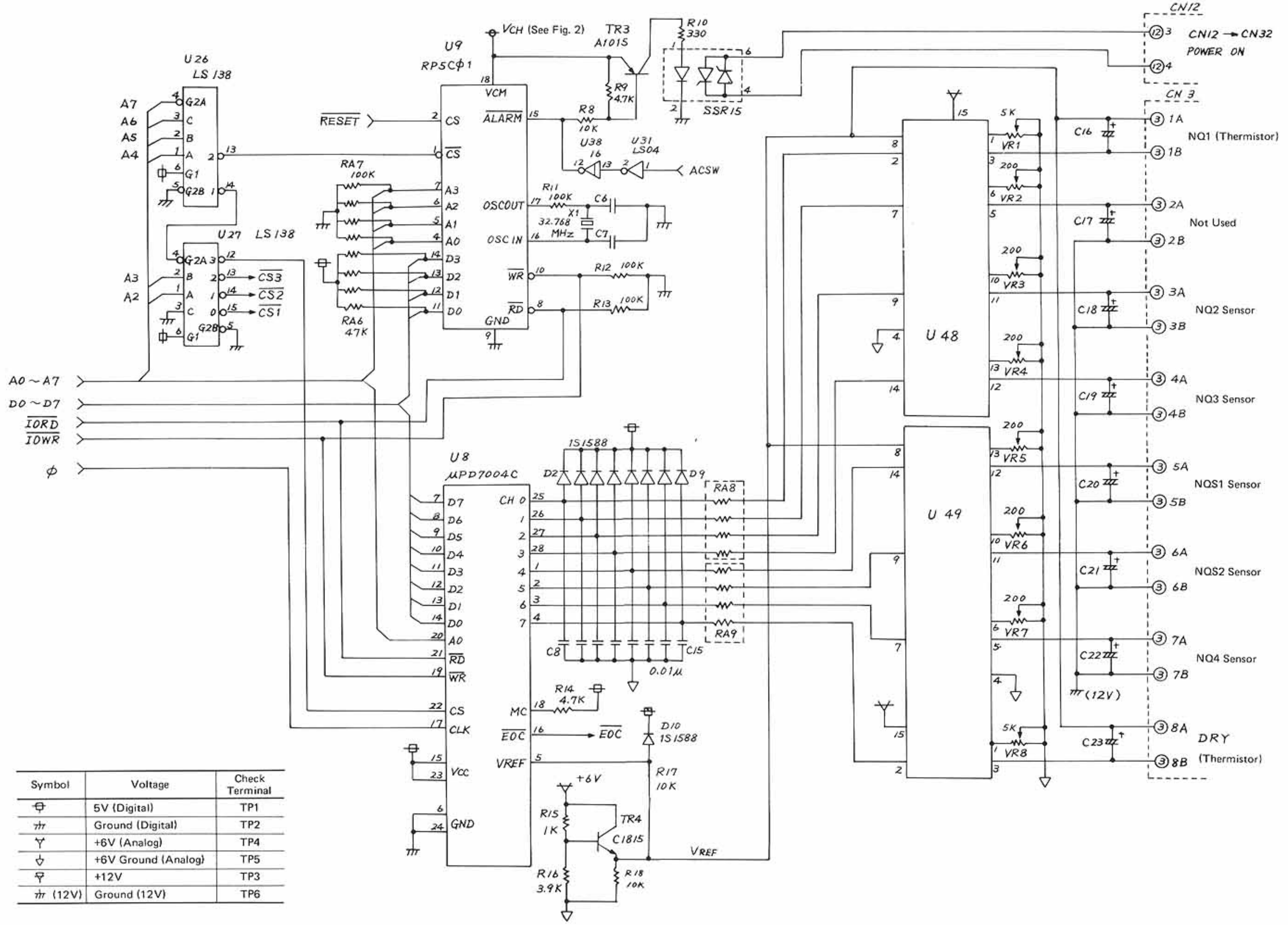
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
⏚	+6V Ground (Analog)	TP5
▽	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 2b FP350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
CPH CIRCUIT BOARD WIRING DIAGRAM 1/5



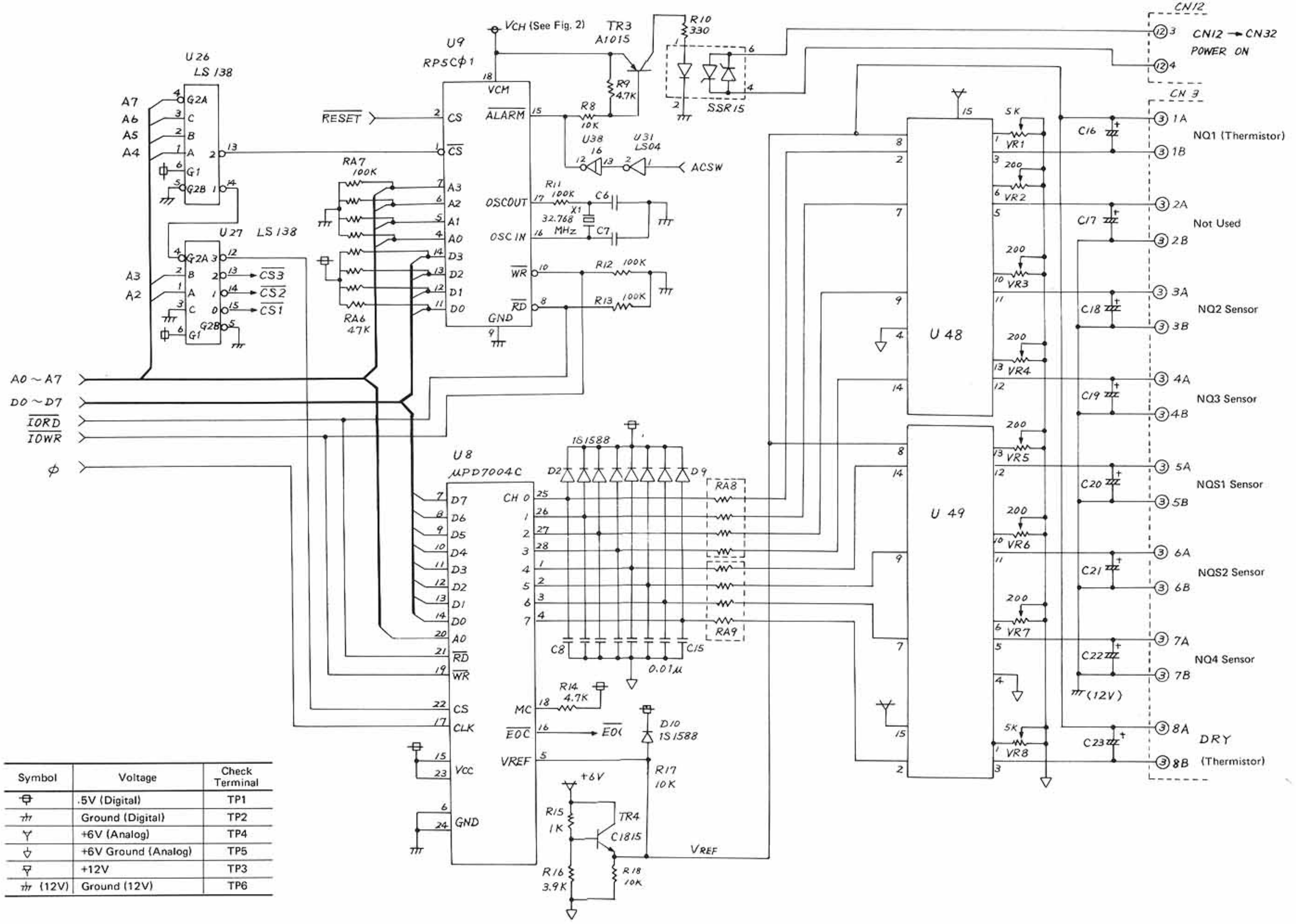
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
⏚	+6V Ground (Analog)	TP5
⊤	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 3a FP350 CPH CIRCUIT BOARD WIRING DIAGRAM 2/5 (SERIAL NUMBERS 2600 AND BELOW)



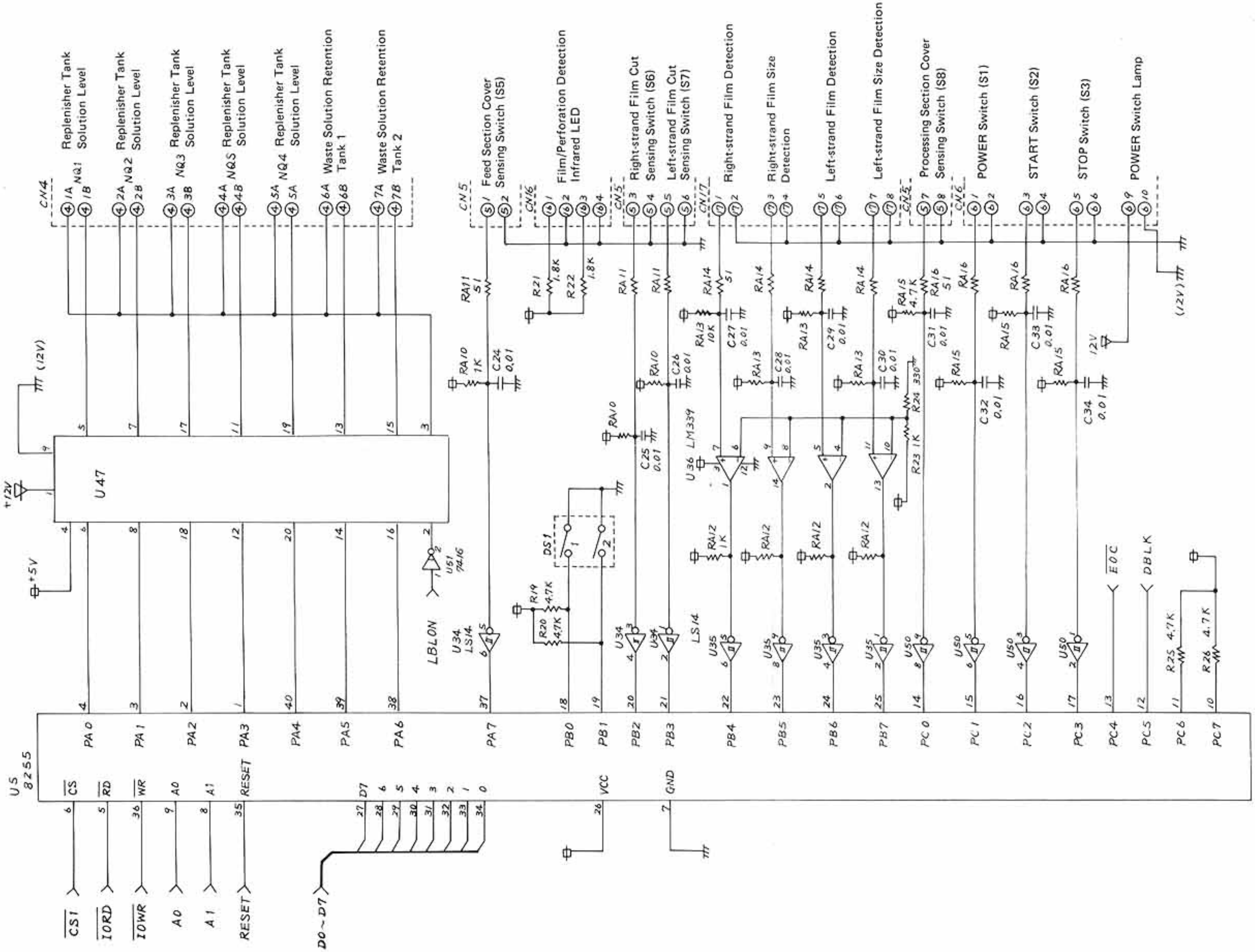
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊕	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 3b FP 350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
CPH CIRCUIT BOARD WIRING DIAGRAM 2/5



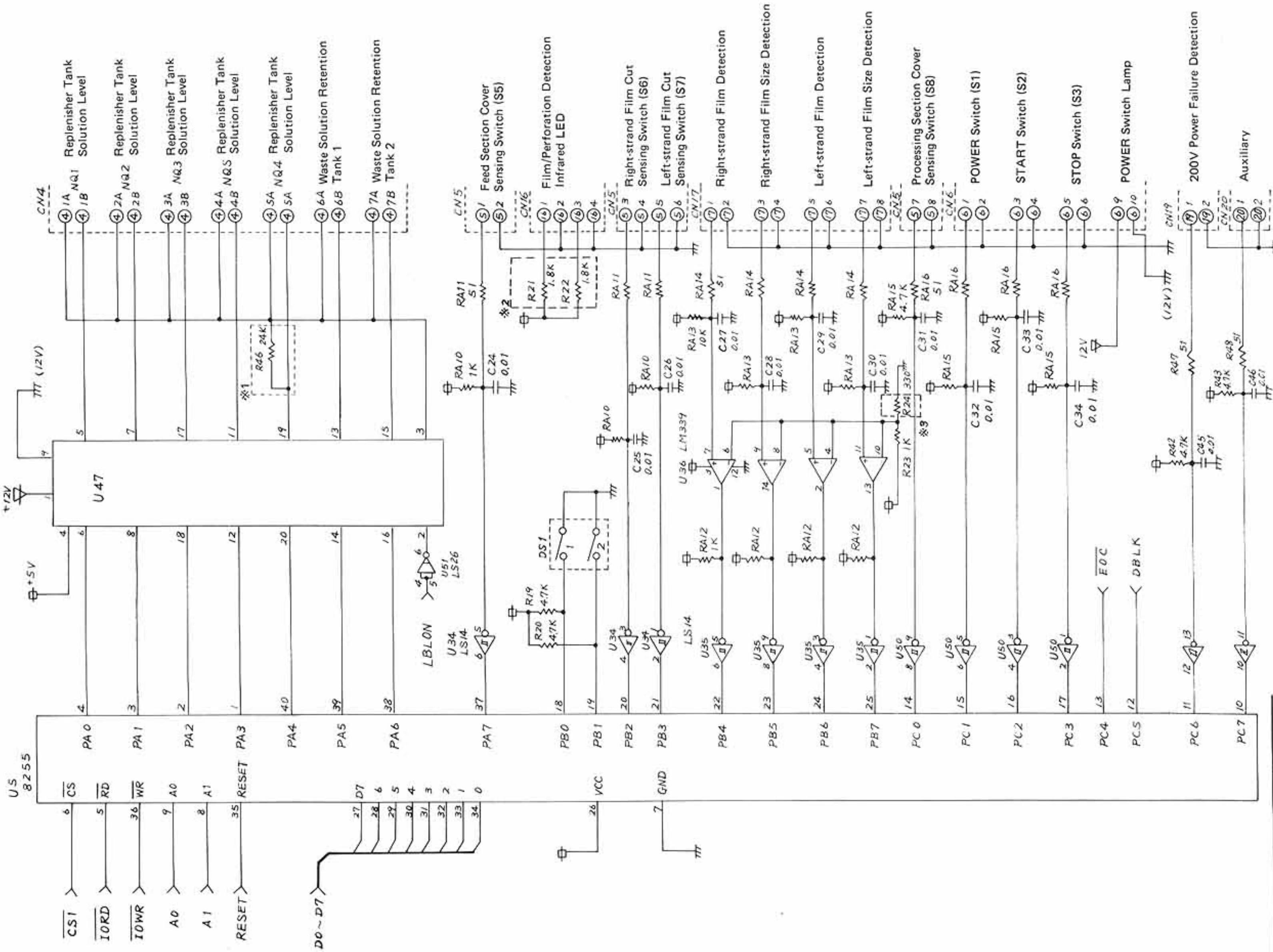
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊼	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 4a FP350 CPH CIRCUIT BOARD WIRING DIAGRAM 3/5 (SERIAL NUMBERS 2600 AND BELOW)



Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊤	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 4b FP350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
CPH CIRCUIT BOARD WIRING DIAGRAM 3/5



Replenisher Tank Solution Level
Replenisher Tank Solution Level
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Waste Solution Retention Tank 1
Waste Solution Retention Tank 2
NQ1
NQ2
NQ3
NQS
NQ4
CN4
Feed Section Cover Sensing Switch (S5)
Film/Perforation Detection Infrared LED
Right-strand Film Cut Sensing Switch (S6)
Left-strand Film Cut Sensing Switch (S7)
Right-strand Film Detection
Right-strand Film Size Detection
Left-strand Film Detection
Left-strand Film Size Detection
Processing Section Cover Sensing Switch (S8)
POWER Switch (S1)
START Switch (S2)
STOP Switch (S3)
POWER Switch Lamp
200V Power Failure Detection
Auxiliary
CN5
CN6
CN7
CN19
CN20
U47
+12V
+5V
(12V)
R46 24K
※1
※2
※3
R21 1.8K
R22 1.8K
R23 1K
R24 330
R19 4.7K
R20 4.7K
R42 4.7K
R43 4.7K
R47 51
R48 51
RA10 1K
RA11 51
RA12 1K
RA13 10K
RA14 51
RA15 4.7K
RA16 51
C24 0.01
C25 0.01
C26 0.01
C27 0.01
C28 0.01
C29 0.01
C30 0.01
C31 0.01
C32 0.01
C33 0.01
C34 0.01
C45 0.01
C46 0.01
U36 LM339
DS1
U51 LS26
U34 LS14
U35 LS14
U50
LBLON
EOC
DBLK
U5 8255
CS
RD
WR
A0
A1
RESET
D7
VCC
GND
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
CS1
IORD
IOWR
A0
A1
RESET
D0 ~ D7

Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊞	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

*1) Resistor R46 (24 kΩ), which is enclosed with a broken line, is mounted only on the circuit boards having the following serial numbers. 86031053 and below and 86031234 through 86031246.

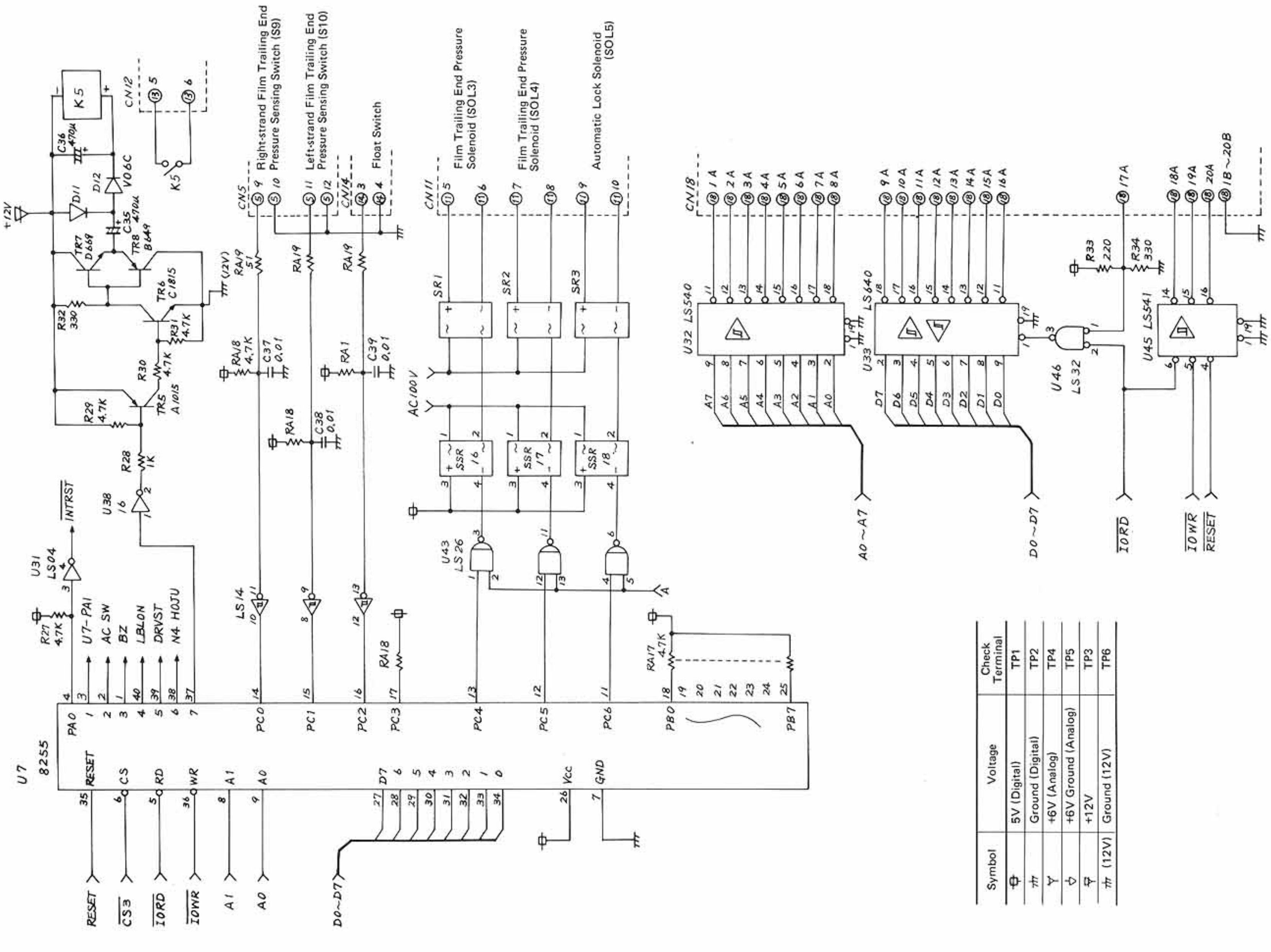
*2) Resistors R21 and R22 (1.8 kΩ) are as indicated below.

CPH Circuit Board Type	R21, R22
113G03062	Mounted
113G03064	Not mounted (jumpered)

*3) Resistor R24 (330 Ω) is as follows. CPH Circuit Board Type

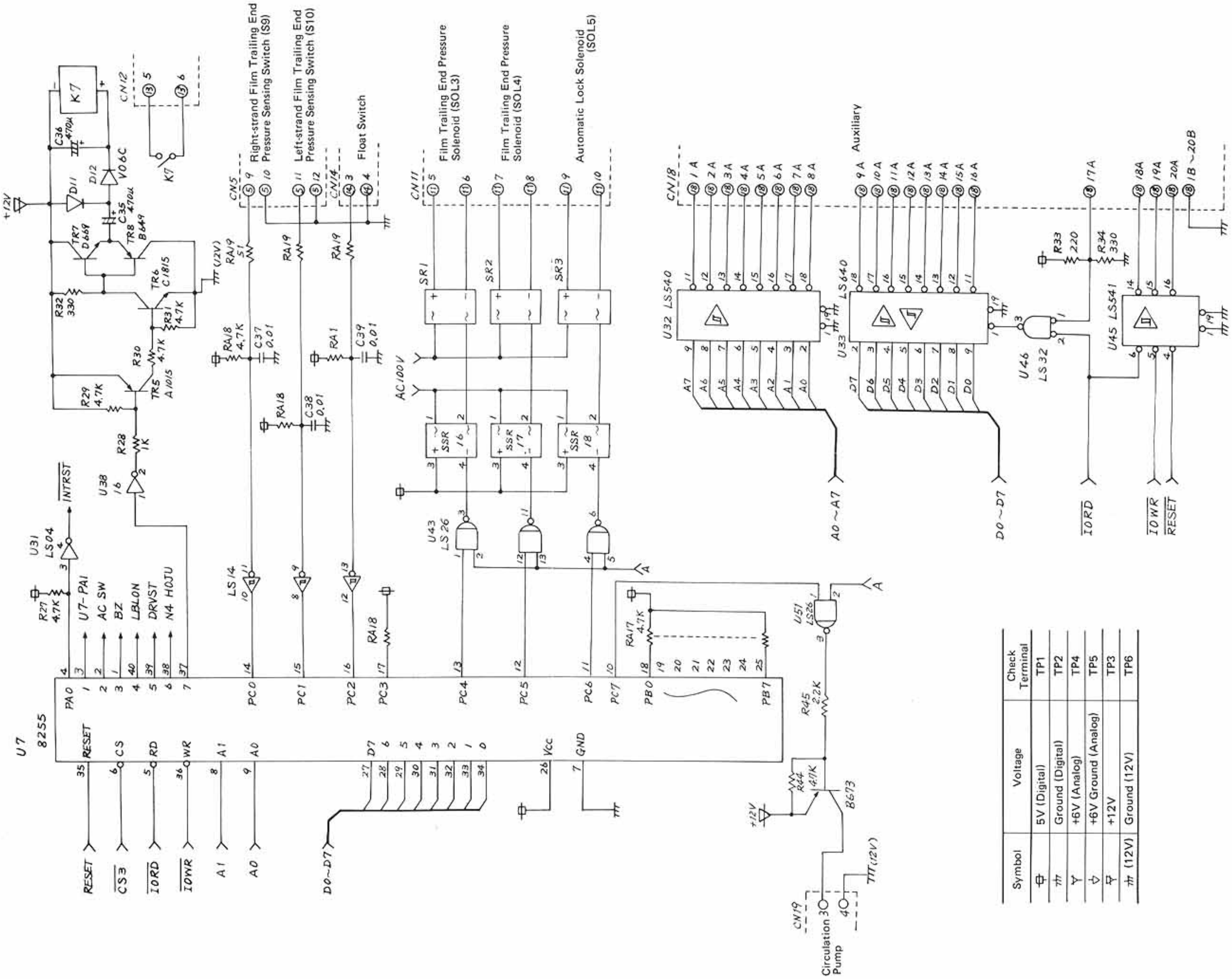
CPH Circuit Board Type	R24
113G03062	330 Ω
113G03064	560 Ω

Fig. 5a FP350 CPH CIRCUIT BOARD WIRING DIAGRAM 4/5 (SERIAL NUMBERS 2600 AND BELOW)



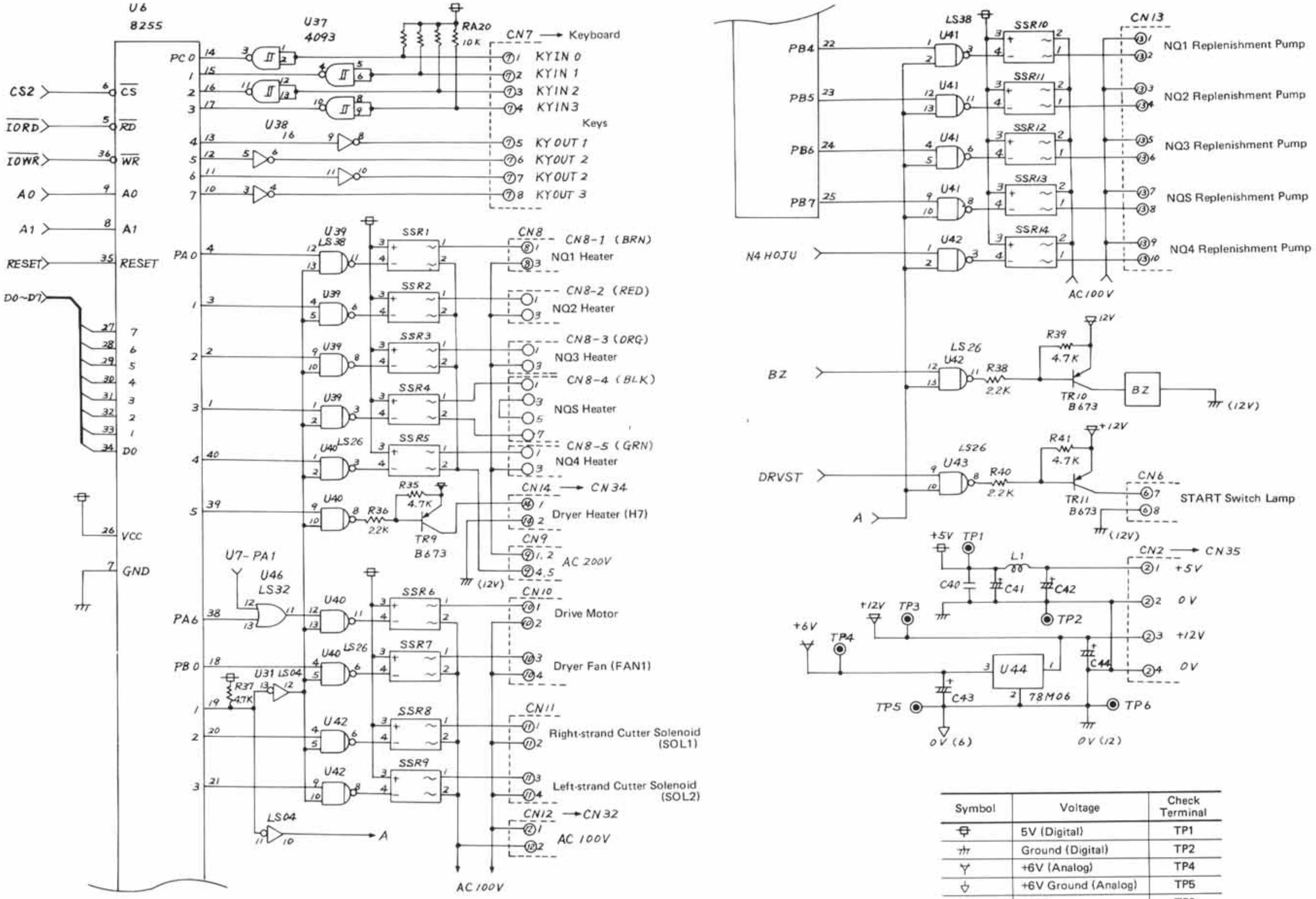
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊤	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 5b FP350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
CPH CIRCUIT BOARD WIRING DIAGRAM 4/5



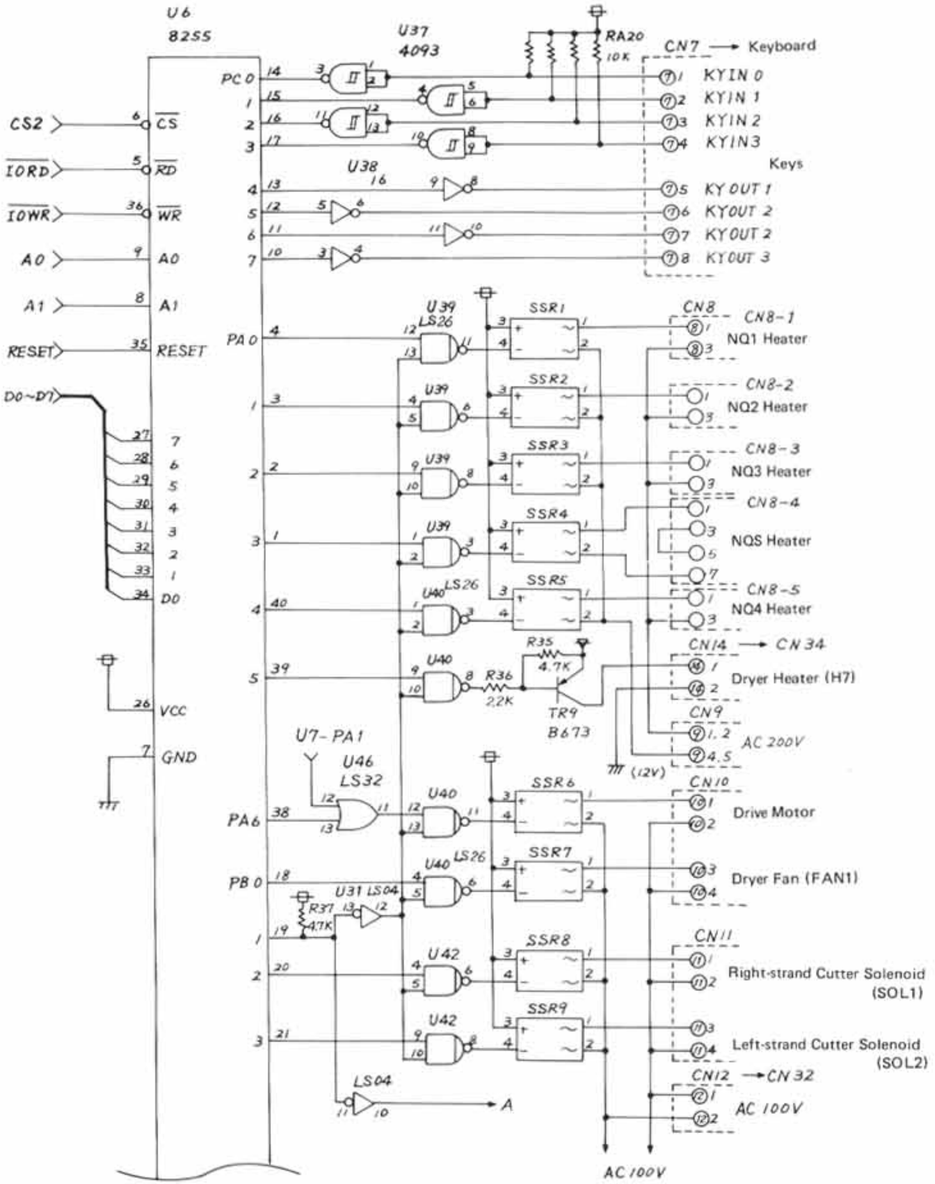
Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
▽	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

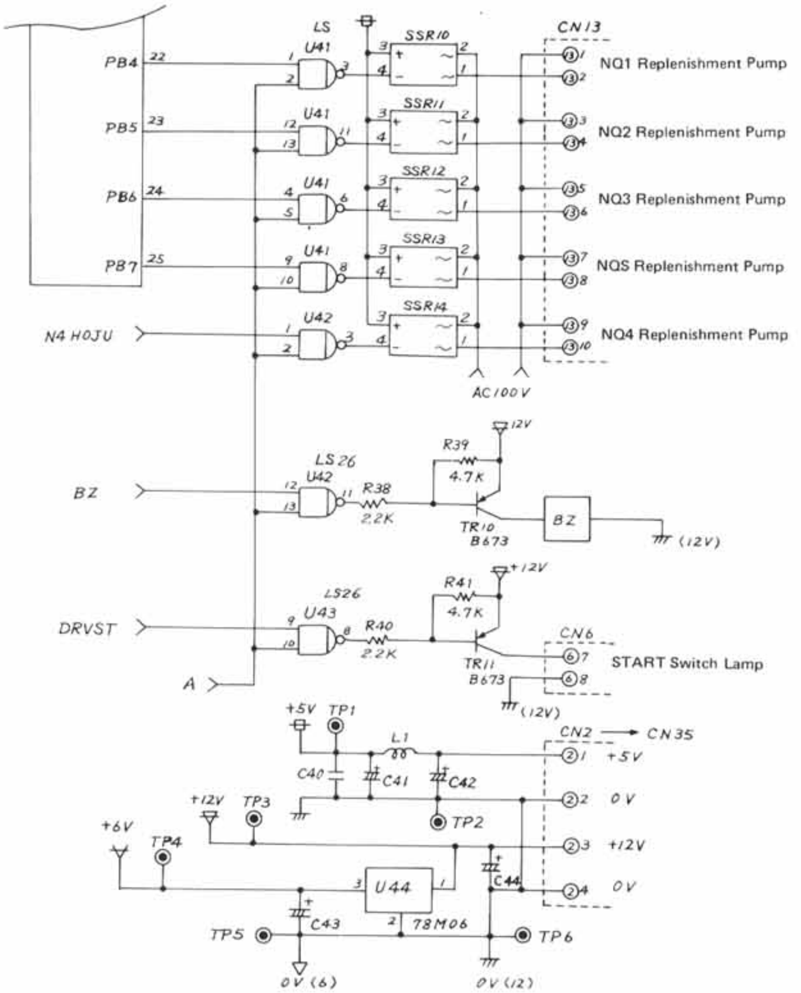
Fig. 6a FP350 CPH CIRCUIT BOARD WIRING DIAGRAM 5/5 (SEIRAL NUMBERS 2600 AND BELOW)



Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
⏚	+6V Ground (Analog)	TP5
▽	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 6b FP350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
CPH CIRCUIT BOARD WIRING DIAGRAM 5/5





Symbol	Voltage	Check Terminal
⊕	5V (Digital)	TP1
⏚	Ground (Digital)	TP2
Y	+6V (Analog)	TP4
▽	+6V Ground (Analog)	TP5
⊽	+12V	TP3
⏚ (12V)	Ground (12V)	TP6

Fig. 7a FP350 PWH CIRCUIT BOARD WIRING DIAGRAM (SERIAL NUMBERS 2600 AND BELOW)

NOTE: The indication "CPH/CN8-4" represents CPH circuit board connector CN8-4.

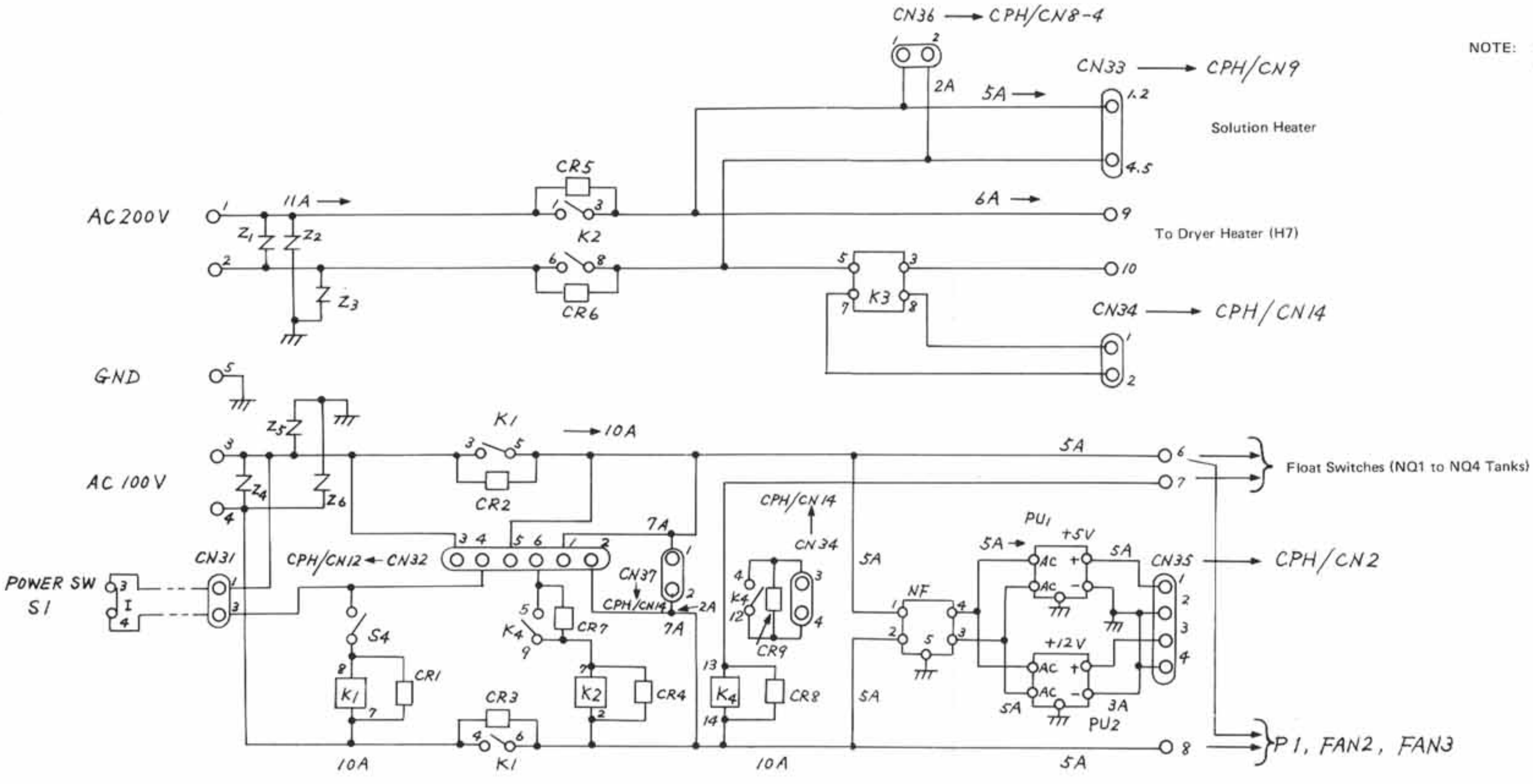
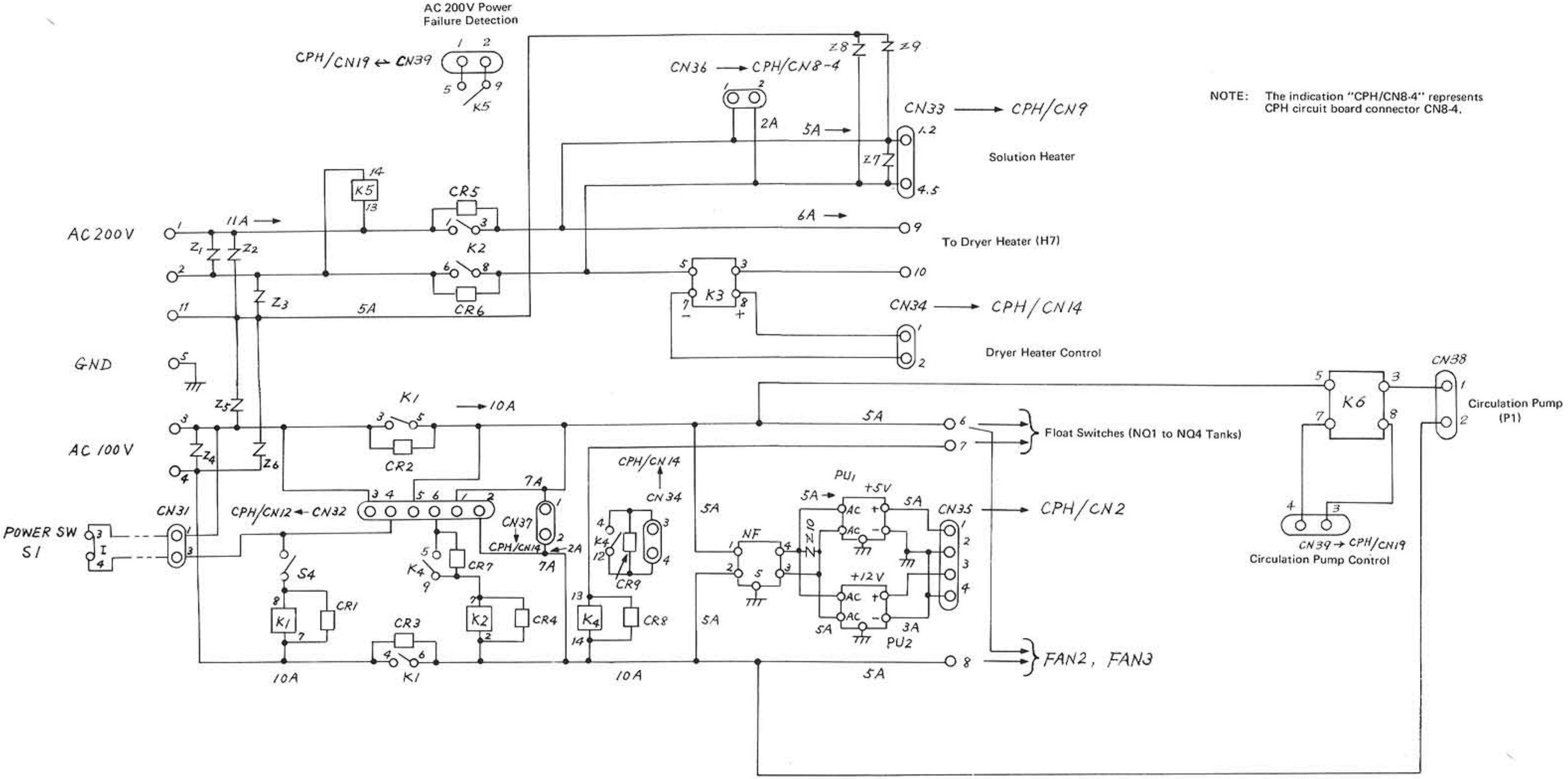


Fig. 7b FP350 (SERIAL NUMBERS 2601 AND ABOVE)
FP350AL (SERIAL NUMBERS 7001 AND ABOVE)
PWH CIRCUIT BOARD WIRING DIAGRAM



NOTE: The indication "CPH/CN8-4" represents CPH circuit board connector CN8-4.

Fig. 8 FP350AL ALH CIRCUIT BOARD WIRING DIAGRAM (SERIAL NUMBERS 7001 AND ABOVE)